# SARANATHAN COLLEGE OF ENGINEERING

## Department of Electrical and Electronics Engineering

## 3.2.1 Assessment Process

## MCQ Online Questions

## R-2013

**MCQ-EE6005- Power Quality**

**Year: IV/VII Sem A & B Sec**
**SEM:07** **REGULATION**: 2013
**PROGRAM**: EEE

**1. _____ is a set of electrical boundaries that allows a piece of equipment to function in its intended manner without significant loss of performance or life expectancy.**

(a) Power factor
(b) Power system
(c) Power quality
(d) Power field

**2. All electrical devices are prone to failure or malfunction when exposed to one or more power quality problems**

(a) True
(b) False

**3. Is it possible that "good" power for one piece of equipment could be “bad” power for another one.**

(a) Yes
(b) No

**4. Two identical devices or pieces of equipment might react differently to the same power quality parameters due to (i) differences in their manufacturing (ii) component tolerance**

(a) Only (i)
(b) Only (ii)
(c) Both (i) and (ii)
(d) some other issue

**5. _____ ensures that any fault current likely imposed on a metal part will be safely conducted to ground or other grid systems serving as ground**

(a) Isolation
(b) Grounding
(c) Coupling
(d) Bonding

**6. _____ is one means by which energy or electrical noise can couple from one electrical circuit to another.**

(a) Resistance
(b) Inductance
(c) Capacitance
(d) Inductive Reactance

**7. _____ is the process by which energy or electrical noise in one circuit can be transferred to another circuit that may or may not be electrically connected to it.**

(a) Bonding
(b) Earthing
(c) Coupling
(d) Isolation

**8. Ratio between the peak value and the root mean square (RMS) value of a periodic waveform is know as**

(a) Form Factor
(b) Crest Factor
(c) Power Factor
(d) Distortion Factor

**9. _____ indicates the deviation of a periodic wave from its ideal waveform characteristics.**

(a) Distortion Factor
(b) Flicker
(c) Distortion
(d) Noise

**10. Ratio of the RMS of the harmonic content of a periodic wave to the RMS of the fundamental content of the wave, expressed as a percent. This is known as _____**

(a) Distortion Factor
(b) Power Factor
(c) Crest Factor
(d) Form Factor

**11. Variation of input voltage sufficient in duration to allow visual observation of a change in electric light sou**

(a) Flicker
(b) Noise
(c) Distortion
(d) Harmonics

**12. Ratio between the RMS value and the average value of a periodic waveform. It is known as**

(a) Crest Factor

(b) Form Factor
(c) Power Factor
(d) Distortion Factor

**13. Number of complete cycles of a periodic wave in a unit time, usually 1 sec is called as**
(a) Phase angle
(b) Amplitude
(c) Phase Difference
(d) Frequncy

**14. Which of the following is true for this statement? "Conductor or a body of conductors in intimate contact with earth for the purpose of providing a connection with the ground"**
(a) Ground loop
(b) Ground grid
(c) Ground electrode
(d) Ground ring

**15. System of interconnected bare conductors arranged in a pattern over a specified area and buried below the surface of the earth is called as**
(a) Ground grid
(b) Ground loop
(c) Ground ring
(d) Ground electrode

**16. Ground loop is Potentially detrimental loop formed when two or more points in an electrical system that are nominally at ground potential are connected by a conducting path such that either or both points are not at the same ground potential.**
(a) True
(b) False

**17. Ground ring should be at a depth below the surface of the earth of not less than _____ ft**
(a) 1
(b) 2
(c) 2.5
(d) 3

**18. The copper conductor not smaller than #___ AWG used as ground ring**
(a) 1
(b) 2

(c) 3

(d) 4

**19. _____ is the Conducting connection by which an electrical circuit or equipment is connected to the earth or to some conducting body of relatively large extent that serves in place of the earth**

(a) Grounding

(b) Bonding

(c) Isolation

(d) Coupling

**20. Sinusoidal component of a periodic wave having a frequency that is an integral multiple of the fundamental frequency is the _____**

(a) Flickering

(b) Harmonics

(c) Distortion

(d) Deviation

# SARANATHAN COLLEGE OF ENGINEERING
## DEPARTMENT OF EEE
## REGULATION – 2013,Odd Semester
## EE6008 – MICROCNTROLLER BASED SYSTEM DESIGN

## OBJECTIVE QESTIONS

**1) Which data memory control and handle the operation of several peripherals by assigning them in the category of special function registers?**
**a.** Internal on-chip RAM
**b.** External off-chip RAM
**c.** Both a & b
**d.** None of the above
**ANSWER: (a) Internal on-chip RAM**

**3) Why is the speed accessibility of external data memory slower than internal on-chip RAM?**
**a.** Due to multiplexing of lower order byte of address-data bus
**b.** Due to multiplexing of higher order byte of address-data bus
**c.** Due to demultiplexing of lower order byte of address-data bus
**d.** Due to demultiplexing of higher order byte of address-data bus
**ANSWER: (a) Due to multiplexing of lower order byte of address-data bus**

**4) Which control signal/s is/are generated by timing and control unit of 8051 microcontroller in order to access the off-chip devices apart from the internal timings?**
**a.** ALE
**b.** PSEN
**c.** RD & WR
**d.** All of the above
**ANSWER: (d) All of the above**

**5) Which register usually store the output generated by ALU in several arithmetic and logical operations?**
**a.** Accumulator
**b.** Special Function Register
**c.** Timer Register
**d.** Stack Pointer
**ANSWER: (a) Accumulator**

**6) Why is CHMOS technology preferred over HMOS technology for designing the devices of MCS-51 family?**

**a.** Due to higher noise immunity
**b.** Due to lower power consumption
**c.** Due to higher speed
**d.** All of the above
**ANSWER: (d) All of the above**

**7) Which condition approve to prefer the EPROM/ROM versions for mass production in order to prevent the external memory connections?**
**a.** size of code < size of on-chip program memory
**b.** size of code > size of on-chip program memory
**c.** size of code = size of on-chip program memory
**d.** None of the above
**ANSWER: (a) size of code < size of on-chip program memory**

**8) Which among the below mentioned devices of MCS-51 family does not possess two 16 -bit timers/counters?**
**a.** 8031
**b.** 8052
**c.** 8751
**d.** All of the above
**ANSWER: (b) 8052**

**9) Which characteristic/s of accumulator is /are of greater significance in terms of its functionality?**
**a.** Ability to store one of the operands before the execution of an instruction
**b.** Ability to store the result after the execution of an instruction
**c.** Both a & b
**d.** None of the above
**ANSWER: (c) Both a & b**

**10) Which general purpose register holds eight bit divisor and store the remainder especially after the execution of division operation?**
**a.** A-Register
**b.** B-Register
**c.** Registers R0 through R7
**d.** All of the above
**ANSWER: (b) B-Register**

**11) How many registers can be utilized to write the programs by an effective selection of register bank in program status word (PSW)?**
**a.** 8
**b.** 16

**c.** 32
**d.** 64
**ANSWER: (c) 32**

**12) Which operations are performed by stack pointer during its incremental phase?**
**a.** Push
**b.** Pop
**c.** Return
**d.** All of the above
**ANSWER: (a) Push**

**13) Which is the only register without internal on-chip RAM address in MCS-51?**
**a.** Stack Pointer
**b.** Program Counter
**c.** Data Pointer
**d.** Timer Register
**ANSWER: (b) Program Counter**

**14) What kind of instructions usually affect the program counter?**
**a.** Call & Jump
**b.** Call & Return
**c.** Push & Pop
**d.** Return & Jump
**ANSWER: (a) Call & Jump**

**15) What is the default value of stack once after the system undergoes the reset condition?**
**a.** 07H
**b.** 08H
**c.** 09H
**d.** 00H
**ANSWER:(a) 07H**

**16) Which bit/s play/s a significant role in the selection of a bank register of Program Status Word (PSW)?**
**a.** RS1
**b.** RS0
**c.** Both a & b
**d.** None of the above
**ANSWER: (c) Both a & b**

**17) Which flags represent the least significant bit (LSB) and most significant bit (MSB) of Program Status Word (PSW) respectively?**
**a.** Parity Flag & Carry Flag
**b.** Parity Flag & Auxiliary Carry Flag
**c.** Carry Flag & Overflow Flag
**d.** Carry Flag & Auxiliary Carry Flag
**ANSWER: (a) Parity Flag & Carry Flag**
**18) Which register bank is supposed to get selected if the values of register bank select bits RS1 & Rs0 are detected to be '1' & '0' respectively?**
**a.** Bank 0
**b.** Bank 1
**c.** Bank 2
**d.** Bank 3
**ANSWER: (c) Bank 2**
**19) It is possible to set the auxiliary carry flag while performing addition or subtraction operations only when the carry exceeds _____**
**a.** 1st bit
**b.** 2nd bit
**c.** 3rd bit
**d.** 4th bit
**ANSWER: (c) 3rd bit**
**20) Which locations of 128 bytes on-chip additional RAM are generally reserved for special functions?**
**a.** 80H to 0FFH
**b.** 70H to 0FFH
**c.** 90H to 0FFH
**d.** 60H to 0FFH
**ANSWER: (a) 80H to 0FFH**
**21) Which commands are used for addressing the off-chip data and associated codes respectively by data pointer?**
**a.** MOVX & MOVC
**b.** MOVY & MOVB
**c.** MOVZ & MOVA
**d.** MOVC & MOVY
**ANSWER: (a) MOVX & MOVC**
**22) Which instruction find its utility in loading the data pointer with 16 bits immediate data?**

**a.** MOV
**b.** INC
**c.** DEC
**d.** ADDC
**ANSWER: (a) MOV**
**23) What is the maximum capability of addressing the off-chip data memory & off-chip program memory in a data pointer?**
**a.** 8K
**b.** 16K
**c.** 32K
**d.** 64K
**ANSWER: (d) 64K**
**24) Which among the below stated registers does not belong to the category of special function registers?**
**a.** TCON & TMOD
**b.** TH0 & TL0
**c.** P0 & P1
**d.** SP & PC
**ANSWER: (d) SP & PC**
**25) Which timer is attributed to the register pair of RCAP2H & RCAP2L for capture mode operation?**
**a.** Timer 0
**b.** Timer 1
**c.** Timer 2
**d.** Timer 3
**ANSWER:(c) Timer 2**
**26) Which registers are supposed to get copied into RCAP2H & RCAP2L respectively due to the transition at 8052 T2EX pin in the capture mode operation?**
**a.** TH0 & TH1
**b.** TH1 & TH1
**c.** TH2 & TH2
**d.** All of the above
**ANSWER: (c) TH2 & TH2**
**27) Which mode of timer 2 allow to hold the reload values with an assistance of RCAP2H & RCAP2L register pair?**
**a.** 8 bit auto-reload mode
**b.** 16 bit auto reload mode

**c.** 8 bit capture mode
**d.** 16 bit capture mode
**ANSWER: (b) 16 bit auto reload mode**
**28) Where should the pin 19 (XTAL1), acting as an input of inverting amplifier as well as part of an oscillator circuit, be connected under the application of external clock?**
**a.** to XTAL2
**b.** to Vcc
**c.** to GND
**d.** to ALE
**ANSWER: (c) to GND**
**29) Which port does not represent quasi-bidirectional nature of I/O ports in accordance to the pin configuration of 8051 microcontroller?**
**a.** Port 0 (Pins 32-39)
**b.** Port 1 (Pins 1-8)
**c.** Port 2 (Pins 21-28)
**d.** Port 3 (Pins 10-17)
**ANSWER: (a) Port 0 (Pins 32-39)**
**30) What is the required baud rate for an efficient operation of serial port devices in 8051 microcontroller?**
**a.** 1200
**b.** 2400
**c.** 4800
**d.** 9600
**ANSWER: (d) 9600**
**31) Which among the below mentioned functions does not belong to the category of alternate functions usually performed by Port 3 (Pins 10-17)?**
**a.** External Interrupts
**b.** Internal Interrupts
**c.** Serial Ports
**d.** Read / Write Control signals
**ANSWER: (b) Internal Interrupts**
**32) What is the constant activation rate of ALE that is optimized periodically in terms of an oscillator frequency?**
**a.** 1 / 8
**b.** 1 / 6
**c.** 1 / 4
**d.** 1 / 2

**ANSWER:(b) 1 / 6**

**33) Which output control signal is activated after every six oscillator periods while fetching the external program memory and almost remains high during internal program execution?**

**a.** ALE
**b.** PSEN
**c.** EA
**d.** All of the above

**ANSWER: (b) PSEN**

**34) Which memory allow the execution of instructions till the address limit of 0FFFH especially when the External Access (EA) pin is held high?**

**a.** Internal Program Memory
**b.** External Program Memory
**c.** Both a & b
**d.** None of the above

**ANSWER: (a) Internal Program Memory**

**35) Which value of disc capacitors is preferred or recommended especially when the quartz crystal is connected externally in an oscillator circuit of 8051?**

**a.** 10 pF
**b.** 20 pF
**c.** 30 pF
**d.** 40 pF

**ANSWER: (c) 30 pF**

**36) Why are the resonators not preferred for an oscillator circuit of 8051?**

**a.** Because they do not avail for 12 MHz higher order frequencies
**b.** Because they are unstable as compared to quartz crystals
**c.** Because cost reduction due to its utility is almost negligible in comparison to total cost of microcontroller board
**d.** All of the above

**ANSWER: (d) All of the above**

**37) Which version of MCS-51 requires the necessary connection of external clock source to XTAL2 in addition to the XTAL1 connectivity to ground level?**

**a.** HMOS
**b.** CHMOS
**c.** CMOS
**d.** All of the abov

**ANSWER: (a) HMOS**

**38) Which signal from CPU has an ability to respond the clocking value of D- flipflop (bit latch) from the internal bus?**

**a.** Write-to-Read Signal
**b.** Write-to-Latch Signal
**c.** Read-to-Write Signal
**d.** Read-to-Latch Signal

**ANSWER: (b) Write-to-Latch Signal**

**39) Which among the below mentioned statements are precisely related to quasi-bidirectional port?**

a. Fixed high pull-up resistors are internally connected
b. Configuration in the form of input pulls the port at higher position whereas they get pulled lower when configured as a source current
c. It is possible to drive the pin as output at any duration when FET gets turned OFF for an input function
d. Upper pull-up FET is always OFF with the provision of 'open-drain' output pin for normal operation of port

**a.** A, B, C, D
**b.** A, B & C
**c.** A & B
**d.** C & D

**ANSWER: (b) A, B & C**

**40) What happens when the pins of port 0 & port 2 are switched to internal ADDR and ADDR / DATA bus respectively while accessing an external memory?**

**a.** Ports cannot be used as general-purpose Inputs/Outputs
**b.** Ports start sinking more current than sourcing
**c.** Ports cannot be further used as high impedance input
**d.** All of the above

**ANSWER: (a) Ports cannot be used as general-purpose Inputs/Outputs**

**41) How many registers can be utilized to write the programs by an effective selection of register bank in program status word (PSW)?**

**a.** 8
**b.** 16
**c.** 32
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**ANSWER: (c) 32**

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**c.** Bank 2
**d.** Bank 3
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**a.** 80H to 0FFH
**b.** 70H to 0FFH
**c.** 90H to 0FFH
**d.** 60H to 0FFH
**ANSWER: (a) 80H to 0FFH**

**SARANATHAN COLLEGE OF ENGINEERING,TRICHY-12**

**DEPARTMENT OF EEE**

**HVDC Transmission – EE6010**

**(Regulation 2013,Even Semester)**

**MCQ Questions**

1. Which of the following assumptions is true while analysing the converter circuit?
   a. Supply voltages are balanced
   b. DC load inductance is infinity
   c. Switches are assumed to be ideal
   d. All of the above

   Ans: d
2. PIV means
   a. Peak Inductor Voltage
   b. Peak Inverse Voltage
   c. Positive Inverse Voltage
   d. None of the above

   Ans: b
3. Volt-ampere rating(ie power rating) of the valve is given by
   a. PIV*Iav
   b. PIV*Irms
   c. PIV*Imax
   d. V*Iav

   Ans: a
4. Rating of the converter transformer is calculated by
   a. Vrms*Iav
   b. Vrms*Imax
   c. Vmax*Imax
   d. Vrms*Irms

   Ans: d
5. Pulse number of the converter is given by the expression
   a. P=q*s/r
   b. P=q/s*r
   c. P=q*s*r
   d. P=S*r/q

   Ans: c
6. The general expression for calculating the output voltage of the converter circuit for $\alpha=0$ is
   a. $Vdo=\{(s*q*Em)*\sin(\pi/q)\}/2\pi$

b. Vdo={(q*Em)*sin(π/q)}/2 π
c. Vdo={(s*Em/q)*sin(π/q)}/2 π
d. Vdo={(s*q*Em)*sin(π/2q)}/2 π

Ans: a

7. The general expression for calculating the Peak Inverse Voltage across a valve when q is even is given by
   a. Em
   b. Em/2
   c. 2*Em
   d. √2*Em

   Ans: c
8. The general expression for calculating the Peak Inverse Voltage across a valve when q is odd is given by
   a. 2*Em*sin(π/2*q)
   b. 2*Em*cos(π/2*q)
   c. 2*Em*sin(π/q)
   d. 2*Em*cos(π/q)

   Ans: b
9. The PIV of a valve and Vdo of the converter must be as_____ as possible and as _____ as possible respectively.
   a. high,low
   b. low,low
   c. high,high
   d. low, high

   Ans: d
10. In a Commutation group which contains 'q' number of valves, how many valves will be conducting at a time neglecting overlap?
    a. q
    b. 1
    c. q-1
    d. q-2

    Ans: b
11. For a given converter, the pulse number (p) and the ratio PIV/Vdo are desired to be
    a. high and low
    b. high
    c. low and high
    d. low

    Ans: a

12. For a given converter, Transformer Utilisation Factor(TUF) and the ratio Vdo/E are desired to be
    a. Zero, high
    b. Near Unity, high
    c. Zero, low
    d. Near Unity, low

    Ans: b
13. The harmonics on the AC side of the converter is given by the expression
    a. n*p
    b. 2*n*p
    c. n*p/2
    d. n*p±1

    Ans: d
14. The lowest order of the harmonics on the AC side of the 6-pulse and 12-pulse converter are
    a. 3and 7
    b. 5 and 7
    c. 5 and 11
    d. 7 and 13

    Ans: c
15. The general expression to compute the ratio PIV/Vdo when 'q' is even is given by
    a. 2 π/{s*q* sin(π/q)}
    b. π/{s*q* sin(π/q)}
    c. 2 π/{q* sin(π/q)}
    d. 2 π/{s*q* sin(π/2*q)}

    Ans: a
16. The general expression to compute the ratio PIV/Vdo when 'q' is odd is given by
    a. 2 π/{s*q* sin(π/q)}
    b. π/{s*q* sin(π/q)}
    c. 2 π/{q* sin(π/q)}
    d. π/{s*q* sin(π/2*q)}

    Ans: d
17. The pulse number, p and value of PIV should be high and low respectively in order to
    a. Increase harmonics and cost of the valve respectively
    b. decrease harmonics and increase cost of the valve respectively
    c. increase harmonics and decrease cost of the valve respectively
    d. decrease harmonics and cost of the valve respectively

    Ans: b
18. the general expression for Vdo/E is given by
    a. {(s*q*√2E)*sin(π/q)}/2 π

b. {(√2s*q)*sin(π/q)}/π
c. {(√2s*q)*sin(π/q)}/2π
d. {(√2s*q)*sin(π/2q)}/π

Ans:b

19. Transformer Utilisation Factor(TUF) is defined as the ratio of
    a. Transformer rating(secondary side) to DC output of the converter
    b. Transformer rating(primary side) to DC input of the converter
    c. DC input of the converter to Transformer rating(primary side)
    d. DC output of the converter to Transformer rating(secondary side)

    Ans:a
20. The expression for transformer secondary side current is given by
    a. $I_t=I_d/\sqrt{q}$
    b. $I_t=I_d/(r*q)$
    c. $I_t=I_d/(r*\sqrt{q})$
    d. $I_t=I_d/q$

    Ans: c
21. The equation for calculating TUF is given by
    a. π/{√2*√q* sin(π/q)}
    b. π/{√q* sin(π/q)}
    c. π/{√2* sin(π/q)}
    d. π/{2*q* sin(π/q)}

    Ans:a
22. The optimum value of 'q' for better TUF is given by
    a. 2
    b. 1
    c. 4
    d. 3

    Ans:d
23. For the 6 pulse Greatz circuit, the values of q,r and s are given by
    a. q=3, r=2 and s=1
    b. q=3, r=1 and s=2
    c. q=2, r=3 and s=1
    d. q=6, r=1 and s=1

    Ans: b
24. How many commutating groups are present in the Greatz converter bridge circuit?
    a. 1
    b. 3
    c. 2
    d. 4

Ans: c

25. In a Greatz converter , a pair of valves, one from each commutating group, is conducting for a period of ___ degrees neglecting overlap.
    a. 60 degrees
    b. 90 degrees
    c. 30 degrees
    d. 45 degrees

Ans: a

26. In a Greatz converter, how many valves will be conducting at a time if overlap is neglected?
    a. 1
    b. 3
    c. 2
    d. 4

Ans: c

27. In a Geatz converter, which of the following assumptions holds true for the current to transfer from one valve to the another valve instantaneously?
    a. Voltages are assumed to be balanced
    b. Source inductances are assumed to be zero
    c. DC load inductance is assumed to be infinity
    d. Valves are assumed to be ideal ones

Ans: b

28. In a Greatz bridge converter, each valve is fired once for every ___ degrees irrespective of the mode of operation.
    a. 30
    b. 90
    c. 180
    d. 60

Ans: d

29. Due to the presence of source _____ of the supply, the current from one valve cannot transfer to the next valve instantaneously.
    a. Inductance
    b. Resistance
    c. Capacitance
    d. None of the above

Ans: a

30. If the overlap angle ‘u’ of valves of the converter is equal to zero, then number of valves conducting at a time is
    a. 3
    b. 1

c. 2
d. 4

Ans: c

31. If the overlap angle ‘u’ is in the range 0<u,60, then number of valves conducting at a time is
    a. 2 0r 3
    b. 1 or 2
    c. 2 or 4
    d. 1 or 3

    Ans: a
32. If the overlap angle ‘u’ for valves of the converter is equal to 60 degree, then number of valves conducting at a time is
    a. 2
    b. 1
    c. 3
    d. 4

    Ans: 3
33. If the overlap angle ‘u’ of valves of the converter is greater than 60 degree, then number of valves conducting at a time is
    a. 2 or 3
    b. 1 or 3
    c. 2 or 4
    d. 3 or 4

    Ans:d
34. When a gate pulse is applied to a valve, it will start conducting only if its commutation voltage is
    a. Negative
    b. Positive
    c. Zero
    d. Greater than supply voltage

    Ans: b

33. The expression for average DC output voltage of the converter is ___ if the firing angle is α degrees neglecting overlap.

    a. $Vd=(3\sqrt{3} * Em*\cos \alpha)/ \pi$

    b. $Vd=(3 * Em*\cos \alpha)/ \pi$

    c. $Vd=(\sqrt{3} * Em*\cos \alpha)/ \pi$

    d. $Vd=(3\sqrt{3} * Em*\cos \alpha)/ 2\pi$

Ans: a

35. The input voltage supplied to the Greatz converter is 230kV and the firing angle of the valves are 60 degrees. Source inductance is assumed to be zero. The output voltage of the converter is given by
    a. 170.2 KV
    b. 155.3 KV
    c. 164.6 KV
    d. 159.2 KV

    Ans: b
36. The average DC output voltage of the converter _____ due to overlap of the conduction of the valves.
    a. Increases
    b. Decreases
    c. Remains the same
    d. Distorts

    Ans: b
37. The three phase bridge converter acts as rectifier when the firing angle value is
    a. $\alpha > 90$
    b. $\alpha < 90$
    c. $90 < \alpha < 180$
    d. $0 < \alpha < 90$

    Ans: d
38. The three phase bridge converter acts as rectifier when the firing angle value is
    a. $\alpha > 90$
    b. $\alpha < 90$
    c. $90 < \alpha < 180$
    d. $0 < \alpha < 90$

    Ans: c
39. Power transmitted from the rectifier end through the DC transmission line depends on
    a. Rectifier output current
    b. Rectifier output voltage
    c. Firing angle
    d. Both rectifier output voltage and current

    Ans: d
40. In order to change the power transmitted in the DC line, current is _____ and voltage is _____.
    a. Constant & varied
    b. Varied & constant

c. Varied & varied
d. Constant & reversed

Ans: a

41. In order to reverse the direction of the power transmitted in the DC line, current is _____ and voltage is _____.
    a. Constant & varied
    b. Varied & constant
    c. Varied & varied
    d. Constant & reversed

    Ans: d
42. The relation between the firing angle and power factor of the converter , neglecting overlap, is given by
    a. cosΦ=2*cos α
    b. cosΦ=cos α
    c. cosΦ=cos2 α
    d. cosΦ=1/cos α

    Ans: b
43. As the firing angle α of the converter increases, then the _____ of the converter _____.
    a. Active power & remains the same
    b. Reactive power & decreases
    c. Active power & increases
    d. reactive power & increases

    Ans: d
44. when the bridge converter is delivering rated active power to the DC transmission line, the reactive power consumed by the converter is ___ of the active power transmitted.
    a. 30 to 40 %
    b. 20 to 30 %
    c. 50 to 60 %
    d. 80 to 90 %

    Ans: c
45. In order to prevent the voltage sag on the AC bus of the power system due to excessive, reactive power consumption of the converter, which of the following is incorporated to the converter side to deliver the reactive power locally to the converter?
    a. Static capacitor
    b. SVS
    c. Filters
    d. All of the above

    Ans: d
46. The average output voltage of the converter Vd is zero when the firing angle α is

a. Zero
b. 90 degrees
c. 60 degrees
d. 120 degrees

Ans: b

47. The delay angle α is not allowed to go below a minimum level for rectifier operation and beyond 180-ϒ for inverter operation where ϒ is the extinction angle in order to ensure the
    a. Smooth firing of all the valves
    b. Elimination of harmonics
    c. Power reversal
    d. None of the above

    Ans: a
48. Typical value of the extinction angle ϒ for the inverter operation is
    a. 5 to 10 degrees
    b. 0 to 5 degrees
    c. 15 to 20 degrees
    d. 30 to 40 degrees

    Ans: c
49. Commutation resistance of the converter is given by
    a. 3*w*L/ π
    b. w*L/ π
    c. π*w*L/3
    d. 3*w*L

    Ans: a
50. The effect of commutation resistance of the converter is that
    a. It increases the output voltage of the converter
    b. It does not affect the output voltage of the converter
    c. It decreases the output voltage of the converter
    d. None of the above

    Ans: c

51. In which of the following mode is the HVDC system operated?
    a. Constant voltage mode
    b. Constant current mode
    c. Constant power mode
    d. None of the above

    Ans. B
52. The increase of power in the HVDC link can be achieved by _____ and yet improving power factor.

a. Increasing α
b. Increasing β
c. Decreasing α
d. Increasing ϒ

Ans. C

53. To avoid commutation failure, it is economical to operate the inverter in ____ control.
    a. Constant Extinction Angle (CEA)
    b. Constant current
    c. Constant β
    d. None of the above

    Ans.a

54. The main problem in CEA control which makes operation unstable is
    a. Negative resistance characteristics
    b. Positive resistance characteristics
    c. Flat resistance characteristics
    d. None of the above

    Ans.a

55. Under normal condition, the rectifier operates at _____ control and the inverter operates at _____ control.
    a. CEA and CC
    b. CC and CC
    c. CEA and CEA
    d. CC and CEA

    Ans. D

56. Voltage or current controllers are always used instead of power control because
    a. The damping factor in DC line is small
    b. Circuit becomes complex and looses flexibility
    c. Strong communication is required
    d. All of the above

    Ans. D

57. The DC link current will increase when the rectifier voltage ___ and inverter voltage _____.
    a. Decreases and increases
    b. Increases and decreses
    c. Increases and increases
    d. Decreases and decreases

    Ans. B

58. When the DC link current increases, which of the following should not be done?
    a. Increasing α
    b. Increasing β

c. Decreasing α
d. Increasing ϒ

Ans.c

59. Tap setting in the converter transformer can be used when
    a. α reaches $\alpha_{min}$
    b. power factor become due to large α
    c. power factor become due to small β
    d. all of the above

    ans. D

60. The main advantage of using power electronics control compared to tap setting control of the transformer is
    a. Power electronics control is quite fast
    b. Power electronics control is easy
    c. Power electronics control consumes less power
    d. None of the above

    Ans. A

61. The signal that is sent from system control to master control is
    a. Current order reference
    b. Power order reference
    c. Voltage order reference
    d. None of the above

    Ans.b

62. T he signal that is sent from master control to valve group control is
    a. Current order reference
    b. Power order reference
    c. Voltage order reference
    d. None of the above

    Ans. A

63. VDCOL refers to
    a. Voltage independent current limit
    b. Voltage dependent current order level
    c. Voltage dependent current order limit
    d. None of the above

    Ans.c

64. The advantage of Independent Phase Control(IPC) is that
    a. It results in uncharacteristic harmonics
    b. It causes harmonic instability
    c. It requires more filters
    d. It gives higher DC output voltage

Ans. D

65. The main disadvantage of the Equidistant Pulse Control (EPC) is that
    a. It does not require synchronisation of control pulses
    b. It results in higher negative damping
    c. It produces low DC output voltage
    d. None of the above

    Ans.c

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

## EE 6502 – Microprocessor & Microcontroller
## Regulation 2013, Odd Semester
## Multiple Choice Questions

**Year/ Sem: III / V**

1 Kilo bits are equal to

- 1000 bits
- 1024 bits
- 1012 bits
- 1008 bits

A Nibble is equal to _____ bit(s)

- 1
- 2
- 4
- 8

Transfer of data from one register to another register is known as _____ register operation.

- Inter
- Intra
- Inside
- In between

8085 microprocessor is an 8-bit microprocessor designed by?

A. IBM
B. Dell
C. Intel
D. VAX

In 8085, 16-bit address bus, which can address upto?

A. 16KB
B. 32KB
C. 64KB
D. 128KB

There are _____ general purpose registers in 8085 processor

A. 5
B. 6
C. 7
D. 8

It is also a 16-bit register works like stack, which is always incremented/decremented by 2 during push & pop operations.

A. Stack pointer
B. Temporary register
C. Flag register
D. Program counter

Flag register is an 8-bit register having _____ 1-bit flip-flops.

A. 3
B. 4
C. 5
D. 6

What is true about Program counter?

A. It is an 8-bit register, which holds the temporary data of arithmetic and logical operations.
B. When an instruction is fetched from memory then it is stored in the program counter
C. It provides timing and control signal to the microprocessor
D. It is a 16-bit register used to store the memory address location of the next instruction to be executed.

This signal indicates that another master is requesting the use of the address and data buses.

A. READY
B. HOLD
C. HLDA
D. INTA

This signal is used as the system clock for devices connected with the microprocessor.

A. X1, X2
B. CLK OUT
C. CLK IN
D. IO/M

Which of the following is true about Control and status signals?

A. These signals are used to identify the nature of operation.
B. There are 3 control signal and 3 status signals.
C. Three status signals are IO/M, S0 & S1.
D. All of the above

How many types of Interfacing?

A. 2
B. 3
C. 4
D. 5

In which type of communication, the interface gets a single byte of data from the microprocessor and sends it bit by bit to the other system serially and vice-a-versa?

A. Parallel Communication Interface
B. Serial Communication Interface
C. Both A and B
D. None of the above

3. Which of the following are known as Higher Address Bus?

A. A15 - A8
B. AD7 - AD0
C. READY
D. WR

View Answer

Ans : A

Explanation: A15 - A8 (Higher Address Bus)

## 4. In which mode, the CPU periodically reads an internal flag of 8279 to check whether any key is pressed or not with key pressure?

A. Interrupt mode
B. Polled mode
C. Decoded Mode
D. Encoded Mode

View Answer
Ans : B

Explanation: In the Polled mode, the CPU periodically reads an internal flag of 8279 to check whether any key is pressed or not with key pressure.

## 5. What is true about Encoded Mode?

A. the unit contains registers to store the keyboard, display modes
B. the counter internally decodes the least significant 2 bits and provides a decoded 1 out of 4 scan on SL0-SL3.
C. the processor is requested service only if any key is pressed, otherwise the CPU will continue with its main task.
D. the counter provides the binary count that is to be externally decoded to provide the scan lines for the keyboard and display.

View Answer
Ans : D

Explanation: In the encoded mode, the counter provides the binary count that is to be externally decoded to provide the scan lines for the keyboard and display.

## 6. Which pin is used to blank the display during digit switching?

A. WR
B. IR
C. BD
D. DB

View Answer
Ans : C

Explanation: BD : It stands for blank display. It is used to blank the display during digit switching.

## 10. MVI K, 20F is an example of?

A. Immediate addressing mode
B. Register addressing mode
C. Direct addressing mode
D. Indirect addressing mode

View Answer

Ans : A

Explanation: Immediate addressing mode : In this mode, the 8/16-bit data is specified in the instruction itself as one of its operand. For example: MVI K, 20F: means 20F is copied into register K.

## 7. Which mode allows 8/16 character multiplexed displays to be organized as dual 4-bit/single 8-bit display units?

A. Display Entry
B. Display Scan
C. Strobed Input
D. Scanned Keyboard Mode

View Answer

Ans : B

Explanation: Display Scan : This mode allows 8/16 character multiplexed displays to be organized as dual 4-bit/single 8-bit display units.

## 8. DMA stands for?

A. Display Memory Access
B. Directly Memory Access
C. Device Memory Access
D. Direct Memory Access

View Answer

Ans : D

Explanation: DMA stands for Direct Memory Access

## 9. Which of the following is not true features of 8257?

A. It has three channels which can be used over three I/O devices.
B. Each channel has 16-bit address and 14-bit counter.
C. Each channel can transfer data up to 64kb.
D. Each channel can be programmed independently.

View Answer
Ans : A

Explanation: It has four channels which can be used over four I/O devices is true.

## 10. What is correct range of frequency for 8257?

A. 500Hz to 3MHz.
B. 250Hz to 2MHz.
C. 250Hz to 3MHz.
D. 500Hz to 2MHz.

View Answer
Ans : C

Explanation: Its frequency ranges from 250Hz to 3MHz.

## 1. What is true about microcontroller?

A. A microcontroller is a small and low-cost microcomputer
B. It is designed to perform the specific tasks of embedded systems
C. microcontroller consists of the processor, the memory, Serial ports, peripherals.
D. All of the above

View Answer
Ans : D

Explanation: All of the above statement are true.

## 2. Which is false about microcontroller?

A. Microcontrollers are used to execute a single task within an application.
B. It consists of CPU, RAM, ROM, I/O ports.
C. Its power consumption is high because it has to control the entire system.
D. It is built with CMOS technology

View Answer
Ans : C

Explanation: It is built with CMOS technology, which requires less power to operate.

## 3. This type of microcontroller is generally used in automatically controlled appliances like automatic operational machines.

A. 8-bit microcontroller
B. 16-bit microcontroller

C. 32-bit microcontroller
D. 64-bit microcontroller

View Answer

Ans : C

Explanation: 32-bit microcontroller : This type of microcontroller is generally used in automatically controlled appliances like automatic operational machines.

## 4. This type of microcontroller is designed in such a way that they do not have a program memory on the chip.

A. External memory microcontroller
B. Embedded memory microcontroller
C. CISC
D. RISC

View Answer

Ans : A

Explanation: External memory microcontroller : This type of microcontroller is designed in such a way that they do not have a program memory on the chip. Hence, it is named as external memory microcontroller.

## 5. Which of the following is an example of Embedded memory microcontroller?

A. Intel 8031 microcontroller
B. Intel 8051 microcontroller.
C. Intel 8081 microcontroller.
D. Intel 8085 microcontroller.

View Answer

Ans : B

Explanation: Intel 8051 microcontroller is an example of Embedded memory microcontroller.

## 6. 8051 microcontroller is designed by Intel in?

A. 1980
B. 1981
C. 1982
D. 1983

View Answer

Ans : B

Explanation: 8051 microcontroller is designed by Intel in 1981. It is an 8-bit microcontroller

## 7. At what PIN number, there is a RESET pin, which is used to reset the microcontroller to its initial values?

A. PIN 9
B. PIN 20
C. PIN 30
D. PIN 35

View Answer

Ans : A

Explanation: Pin 9 : It is a RESET pin, which is used to reset the microcontroller to its initial values.

## 8. At what PIN number, there is EA pin which stands for External Access input?

A. PIN 28
B. PIN 29
C. PIN 30
D. PIN 31

View Answer

Ans : C

Explanation: Pin 30 : This is EA pin which stands for External Access input. It is used to enable/disable the external memory interfacing.

## 9. When pins are configured as an output (i.e. logic 0), then the single port pins can receive a current of?

A. 5mA
B. 8mA
C. 15mA
D. 10mA

View Answer

Ans : D

Explanation: When pins are configured as an output (i.e. logic 0), then the single port pins can receive a current of 10mA.

10. Which IO Port can be used for higher address byte with addresses A8-A15?

A. PORT1
B. PORT0
C. PORT3
D. PORT2

View Answer

Ans : D

Explanation: PORT2 : This port can be used for higher address byte with addresses A8-A15. When no memory is added then this port can be used as a general input/output port similar to Port 1.

1. The _____ is a general purpose programmable I/O device designed to transfer the data from I/O to interrupt I/O.

A. 8285A
B. 8241A
C. 8255A
D. 8251A

View Answer

Ans : C

Explanation: The 8255A is a general purpose programmable I/O device designed to transfer the data from I/O to interrupt I/O

2. How many ports 8255A has?

A. 2
B. 3
C. 4
D. 5

View Answer

Ans : B

Explanation: 8255A has three ports, i.e., PORT A, PORT B, and PORT C.

3. Which port can be split into two parts?

A. PORT A
B. PORT B
C. PORT C
D. PORT D

View Answer
Ans : C

Explanation: Port C can be split into two parts, i.e. PORT C lower (PC0-PC3) and PORT C upper (PC7-PC4) by the control word.

## 4. Which of the following are Features of 8255A?

A. It consists of 3 8-bit IO ports i.e. PA, PB, and PC.
B. Address/data bus must be externally demux'd.
C. It is TTL compatible.
D. All of the above

View Answer
Ans : D

Explanation: All of the above are Features of 8255A.

## 5. Which of the following is responsible for controlling the internal/external transfer of data/control/status word?

A. Data Bus Buffer
B. Read/Write Control Logic
C. CS
D. WR

View Answer
Ans : B

Explanation: Read/Write Control Logic : This block is responsible for controlling the internal/external transfer of data/control/status word.

## 6. Which of the following uses N-MOS technology?

A. 8253
B. 8254
C. 8255
D. 8256

View Answer
Ans : A

Explanation: 8253 : It uses N-MOS technology.

7. It is a tri-state, bi-directional, 8-bit buffer, which is used to interface the 8253/54 to the system data bus.

A. Read/Write Logic
B. Data Bus Buffer
C. system data bus
D. System Buffer

View Answer

Ans : B

Explanation: Data Bus Buffer : It is a tri-state, bi-directional, 8-bit buffer, which is used to interface the 8253/54 to the system data bus.

8. 8253/54 can be operated in _____ Modes?

A. 3
B. 4
C. 5
D. 6

View Answer

Ans : D

Explanation: 8253/54 can be operated in 6 different modes

9. Which mode can be used as a mono stable multi-vibrator?

A. Mode 0
B. Mode 1
C. Mode 2
D. Mode 3

View Answer

Ans : B

Explanation: Mode 1 : Programmable One Shot can be used as a mono stable multi-vibrator.

10. Which mode generates a strobe in response to an externally generated signal?

A. Mode 3
B. Mode 4
C. Mode 5
D. Mode 6

View Answer
Ans : C

Explanation: Mode 5 : Hardware Triggered Mode generates a strobe in response to an externally generated signal.

### 1. A machine language instruction format consists of -

- Operation code field
- Operation code field & operand field
- Operand field
- none of the mentioned

View Answer
**A machine language instruction format consists of Operation code field & operand field.**

### 2. The instruction, MOV AX, 1234H is an example of -

- register addressing mode
- immediate addressing mode
- based indexed addressing mode
- direct addressing mode

View Answer

**The instruction, MOV AX, 1234H is an example of immediate addressing mode.**

### 3. The full form of FPGA is -

- Forward Programmable Gate Array
- Forward Parallel Gate Array
- Field Programmable Gate Array
- Field Parallel Gate Array

View Answer

**The full form of FPGA is Field Programmable Gate Array**

### 4. Which language could be used for programming an FPGA.

- VHDL
- Verilog
- Both A and B
- None

View Answer

**Both A and B**

### 5. 8085 microprocessor has how many pins -

- 41.
- 39.
- 40.
- 30.

View Answer

**8085 microprocessor has 40 pins .**

### 6. What is SIM?

- Set interrupt mask.
- Sorting interrupt mask.
- Select interrupt mask.
- None of these

View Answer

**SIM stands for Set interrupt mask.**

### 7. The ROM programmed during manufacturing process itself is called -

- EPROM

- PROM
- EEPROM
- MROM

View Answer

**The ROM programmed during manufacturing process itself is called MROM**

### 8. The ROM programmed during manufacturing process itself is called -

- EPROM
- PROM
- EEPROM
- MROM

View Answer

**The ROM programmed during manufacturing process itself is called MROM**

### 9. Output of the assembler in machine codes is referred to as -

- Source program
- Macroinstruction
- Object program
- Symbolic addressing

View Answer

**Output of the assembler in machine codes is referred to as Object program.**

### 10. The software used to drive microprocessor-based systems is called-

- firmware
- machine language code
- BASIC interpreter instructions
- assembly language

View Answer

**The software used to drive microprocessor-based systems is called assembly language**

### 11. How many buses are connected as part of the 8085A microprocessor?

- 8
- 5
- 3
- 2

View Answer

**3 buses are connected as part of the 8085A microprocessor.**

### 12. The items that you can physically touch in a computer system are called:-

- firmware
- hardware
- software
- none of the above

View Answer

**The items that you can physically touch in a computer system are called hardware.**

### 13. ALU (Arithmetic and Logic Unit ) of 8085 microprocessor consists of-

- Accumulator, arithmetic, logic circuits and five flags
- Accumulator, arithmetic and logic circuits
- Accumulator, temporary register, arithmetic, logic circuits and five flags
- Accumulator, temporary register, arithmetic and logic circuits

View Answer

**ALU (Arithmetic and Logic Unit ) of 8085 microprocessor consists of Accumulator, temporary register, arithmetic, logic circuits and five flags.**

### 14. Register pair used to indicate memory-

- B and C
- D and E
- H and L
- W and Z

View Answer

**Register pair used to indicate memory H and L.**

**15. The Intel 8086 microprocessor is a _____ processor.**

- 16 bit
- 32 bit
- 8 bit
- 4 bit

View Answer

**The Intel 8086 microprocessor is a 16 bit processor.**

**16. In which year, 8086 microprocessor was introduced?**

- 1978
- 1979
- 1977
- 1981

View Answer

**In 1978 8086 microprocessor was introduced .**

**17. In 8086, Example for Non maskable interrupts are _____.**

- rst6.5
- intr
- rst6.6
- trap

View Answer

**In 8086, Example for Non maskable interrupts are trap.**

### 18. RIM is used to check whether, _____

- The interrupt is Masked or not
- The write operation is done or not
- both 1 & 2
- None of these

View Answer

**RIM is used to check whether the interrupt is Masked or not.**

### 19. The first digital computer build with IC chips was known as -

- Apple -1
- IBM 7090
- IBM system / 360
- VAX - 10

View Answer

**The first digital computer build with IC chips was known as IBM system / 360.**

### 20. Which of the following is used for manufacturing chips?

- Control bus
- Control unit
- Parity unit
- Semiconductor

View Answer

**Semiconductor is used for manufacturing chips.**

### 21. Which of following instruction subtract memory and carry from a,b

- AB[a,x,y]

- SBC[a,b]
- SUB[a,b,d]
- tst[a,b]

View Answer

**SBC[a,b] instruction subtract memory and carry from a,b.**

### 22. Which of following load the stack pointer

- bgt
- LDS
- bhs
- RTS

View Answer

**LDS load the stack pointer**

1. In the I/O mode, the 8255 ports work as
a) reset pins
b) set pins
c) programmable I/O ports
d) only output ports
View Answer
Answer: c
Explanation: In the I/O mode, the 8255 ports work as programmable I/O ports.

2. In BSR mode, only port C can be used to
a) set individual ports
b) reset individual ports
c) set and reset individual ports
d) programmable I/O ports
View Answer
Answer: c
Explanation: In BSR (Bit Set-Reset) Mode, port C can be used to set and reset its individual port bits.

3. The feature of mode 0 is
a) any port can be used as input or output
b) output ports are latched
c) maximum of 4 ports are available
d) all of the mentioned
View Answer
Answer: d
Explanation: In mode 0, any port can be used as input or output and output ports are latched.

4. The strobed input/output mode is another name of
a) mode 0
b) mode 1
c) mode 2
d) none
View Answer
Answer: b
Explanation: In this mode, the handshaking signals control the input or output action of the specified port.

5. If the value of the pin STB (Strobe Input) falls to low level, then
a) input port is loaded into input latches
b) input port is loaded into output latches
c) output port is loaded into input latches
d) output port is loaded into output latches
View Answer
Answer: a
Explanation: If the value of the pin STB (Strobe Input) falls to low level, the input port is loaded into input latches.

6. The signal, SLCT in the direction of signal flow, OUT, indicates the selection of
a) Control word register
b) CPU
c) Printer
d) Ports
View Answer
Answer: c
Explanation: This signal indicates that the printer is selected.

7. The pulse width of the signal INIT at the receiving terminal must be more than
a) 10 microseconds
b) 20 microseconds
c) 40 microseconds
d) 50 microseconds
View Answer
Answer: d
Explanation: The pulse width of the signal must be more than 50microseconds at the receiving terminal.

8. The level of the signal ERROR(active low) becomes ‘low’ when the printer is in
a) Paper end state
b) Offline state
c) Error state
d) All of the mentioned
View Answer
Answer: d
Explanation: The level of the signal ERROR(active low) becomes ‘low’ when the printer is in the Paper end state, Offline state and Error state.

9. The signals that are provided to maintain proper data flow and synchronization between the data transmitter and receiver are
a) handshaking signals
b) control signals
c) input signals

d) none
View Answer
Answer: a
Explanation: Handshaking signals maintain proper data flow and synchronization.

10. The feature of mode 2 of 8255 is
a) single 8-bit port is available
b) both inputs and outputs are latched
c) port C is used for generating handshake signals
d) all of the mentioned
View Answer
Answer: d
Explanation: In mode 2 of 8255, a single 8-bit port is available i.e group A.

1. The time taken by the ADC from the active edge of SOC(start of conversion) pulse till the active edge of EOC(end of conversion) signal is called
a) edge time
b) conversion time
c) conversion delay
d) time delay
View Answer
Answer: c
Explanation: Broadly speaking, the time taken by the converter to calculate the equivalent digital data output from the moment of the start of conversion is called conversion delay.

2. The popular technique that is used in the integration of ADC chips is
a) successive approximation
b) dual slope integration
c) successive approximation and dual slope integration
d) none
View Answer
Answer: c
Explanation: Successive approximation and dual slope integration are the most popular techniques that are used in the integrated ADC chips.

3. The procedure of algorithm for interfacing ADC contain
a) ensuring stability of analog input
b) issuing start of conversion pulse to ADC
c) reading digital data output of ADC as equivalent digital output
d) all of the mentioned
View Answer
Answer: d
Explanation: The general algorithm for interfacing ADC contains ensuring the stability of analog input, issuing start of conversion pulse to ADC, reading end of conversion signal to mark the end of a conversion process, reading digital data output of ADC as equivalent digital output.

4. Which is the ADC among the following?
a) AD 7523
b) 74373
c) 74245
d) ICL7109
View Answer

Answer: d
Explanation: AD 7523 is a DAC(Digital to analog converter), 74373 is a latch, 74245 is transceiver and ICL7109 is an ADC.

5. The conversion delay in a successive approximation of an ADC 0808/0809 is
a) 100 milliseconds
b) 100 microseconds
c) 50 milliseconds
d) 50 milliseconds
View Answer
Answer: b
Explanation: The conversion delay is 100microseconds which is low as compared to other converters.

6. The number of inputs that can be connected at a time to an ADC that is integrated with successive approximation is
a) 4
b) 2
c) 8
d) 16
View Answer
Answer: c
Explanation: As these converters internally have 3:8 analog multiplexer, at a time 8 different analog inputs can be connected to the chip.

7. ADC 7109 integrated by Dual slope integration technique is used for
a) low cost option
b) slow practical applications
c) low complexity
d) all of the mentioned
View Answer
Answer: d
Explanation: Compared to other 12-bit ADCs, it is of very low cost and useful for slow practical applications.

8. Which of the following is not one of the phases of the total conversion cycle?
a) autozero phase
b) conversion phase
c) signal integrate phase
d) disintegrate phase
View Answer
Answer: b
Explanation: Autozero phase, signal integrate phase and disintegrate phase are the three phases of total conversion cycle.

9. Which of the following phase contain feedback loop in it?
a) autozero phase
b) signal integrate phase
c) disintegrate phase
d) none
View Answer
Answer: a
Explanation: A feedback loop is closed around the system to charge the autozero

capacitor to compensate for the offset voltages in the buffer amplifier, integrator and comparator.

10. In the signal integrate phase, the differential input voltage between IN LO(input low) and IN HI(input high) pins is integrated by the internal integrator for a fixed period of
a) 256 clock cycles
b) 1024 clock cycles
c) 2048 clock cycles
d) 4096 clock cycles
View Answer
Answer: c
Explanation: The internal integrator needs 2048 clock cycles to integrate voltage difference between input low and input high.

1. DAC (Digital to Analog Converter) finds application in
a) digitally controlled gains
b) motor speed controls
c) programmable gain amplifiers
d) all of the mentioned
View Answer
Answer: d
Explanation: DAC is used in digitally controlled gains, motor speed controls and programmable gain amplifiers.

2. To save the DAC from negative transients the device connected between OUT1 and OUT2 of AD 7523 is
a) p-n junction diode
b) Zener
c) FET
d) BJT (Bipolar Junction transistor)
View Answer
Answer: b
Explanation: Zener is connected between OUT1 and OUT2 pins of AD7523 to save from negative transients.

3. An operational amplifier connected to the output of AD 7523 is used
a) to convert current output to output voltage
b) to provide additional driving capability
c) as current-to-voltage converter
d) all of the mentioned
View Answer
Answer: d
Explanation: An operational amplifier is used as a current-to-voltage converter to convert the current output to output voltage and also provides additional driving capability to the DAC.

4. The DAC 0800 has a settling time of
a) 100 milliseconds
b) 100 microseconds
c) 50 milliseconds
d) 50 microseconds
View Answer

Answer: a
Explanation: DAC 0800 has a settling time of 100 milliseconds.

5. The device that is used to obtain an accurate position control of rotating shafts in terms of steps is
a) DC motor
b) AC motor
c) Stepper motor
d) Servo motor
View Answer
Answer: c
Explanation: Stepper motor employs rotation of its shaft in terms of steps, rather than continuous rotation as in case of AC or DC motors.

6. The internal schematic of a typical stepper motor has
a) 1 winding
b) 2 windings
c) 3 windings
d) 4 windings
View Answer
Answer: d
Explanation: The internal schematic of a typical stepper motor has 4 windings.

7. The number of pulses required for one complete rotation of the shaft of the stepper motor is equal to the
a) number of internal teeth on a rotor
b) number of internal teeth on a stator
c) number of internal teeth on a rotor and stator
d) number of external teeth on a stator
View Answer
Answer: a
Explanation: The number of pulses required for one complete rotation of the shaft of the stepper motor is equal to the number of internal teeth on its rotor.

8. A simple scheme for rotating the shaft of a stepper motor is called
a) rotating scheme
b) shaft scheme
c) wave scheme
d) none
View Answer
Answer: c
Explanation: In this scheme, the windings are applied with the required voltage pulses, in a cyclic fashion.

9. The firing angles of thyristors are controlled by
a) pulse generating circuits
b) relaxation oscillators
c) microprocessor
d) all of the mentioned
View Answer
Answer: d
Explanation: In early days, the firing angles were controlled by a pulse generating circuits like relaxation oscillators and now, they are accurately fired using a microprocessor.

10. The Isolation transformers are generally used for
a) protecting low power circuit
b) isolation
c) protecting low power circuit and isolation
d) none
View Answer
Answer: c
Explanation: Any switching component of a high power circuit may be sufficient to damage the microprocessor system. So, to protect the low power circuit isolation transformers are used. They are also used if isolation is necessary.

1. The number of counters that are present in the programmable timer device 8254 is
a) 1
b) 2
c) 3
d) 4
View Answer
Answer: c
Explanation: There are three counters that can be used as either counters or delay generators.

2. The operation that can be performed on control word register is
a) read operation
b) write operation
c) read and write operations
d) none
View Answer
Answer: b
Explanation: The control word register can only be written and cannot be read.

3. The mode that is used to interrupt the processor by setting a suitable terminal count is
a) mode 0
b) mode 1
c) mode 2
d) mode 3
View Answer
Answer: a
Explanation: Mode 0 is also called as an interrupt on the terminal count.

4. In mode 2, if N is loaded as the count value, then after (N-1) cycles, the output becomes low for
a) 1 clockcycle
b) 2 clockcycles
c) 3 clockcycles
d) 4 clockcycles
View Answer
Answer: a
Explanation: After (N-1) cycles, the output becomes low for only 1 clockcycle. If the count N is reloaded and again the output becomes high and remains so for (N-1) clock pulses.

5. The generation of a square wave is possible in the mode
a) mode 1
b) mode 2
c) mode 3
d) mode 4
View Answer
Answer: c
Explanation: When the count N loaded is even, then for half of the count, the output remains high and for the remaining half it remains low. If the count loaded is odd, the first clock pulse decrements it by 1 resulting in an even count value.

6. In control word register, if SC1=0 and SC0=1, then the counter selected is
a) counter 0
b) counter 1
c) counter 2
d) none
View Answer
Answer: b
Explanation: SC denotes select counter.

7. In control word format, if RL1=1, RL0=1 then the operation performed is
a) read/load least significant byte only
b) read/load most significant byte only
c) read/load LSB first and then MSB
d) read/load MSB first and then LSB
View Answer
Answer: c
Explanation: To access 16 bit, first LSB is loaded first, and then MSB.

8. If BCD=0, then the operation is
a) decimal count
b) hexadecimal count
c) binary count
d) octal count
View Answer
Answer: b
Explanation: If BCD=0 then hexadecimal count. If BCD=1, then the operation is BCD count.

9. The counter starts counting only if
a) GATE signal is low
b) GATE signal is high
c) CLK signal is low
d) CLK signal is high
View Answer
Answer: b
Explanation: If the GATE signal is enabled, then the counter starts counting.

10. The control word register contents are used for
a) initializing the operating modes
b) selection of counters
c) choosing binary/BCD counters
d) all of the mentioned
View Answer

Answer: d
Explanation: The control word register contents are used for
i) initializing the operating modes (mode 0-mode 4)
ii) selection of counters (counter0-counter2)
iii) choosing binary or BCD counters
iv) loading of the counter registers.

1. The number of hardware interrupts that the processor 8085 consists of is
a) 1
b) 3
c) 5
d) 7
View Answer
Answer: c
Explanation: The processor 8085 has five hardware interrupt pins. Out of these five, four pins were alloted fixed vector addresses but the pin INTR was not alloted by vector address, rather an external device was supposed to hand over the type of the interrupt to the microprocessor.

2. The register that stores all the interrupt requests in it in order to serve them one by one on a priority basis is
a) Interrupt Request Register
b) In-Service Register
c) Priority resolver
d) Interrupt Mask Register
View Answer
Answer: a
Explanation: The interrupts at IRQ input lines are handled by Interrupt Request Register internally.

3. The register that stores the bits required to mask the interrupt inputs is
a) In-service register
b) Priority resolver
c) Interrupt Mask register
d) None
View Answer
Answer: c
Explanation: Also, Interrupt Mask Register operates on IRR(Interrupt Request Register) at the direction of the Priority Resolver.

4. The interrupt control logic
a) manages interrupts
b) manages interrupt acknowledge signals
c) accepts interrupt acknowledge signal
d) all of the mentioned
View Answer
Answer: d
Explanation: The interrupt control logic performs all the operations that are involved within the interrupts like accepting and managing interrupt acknowledge signals, interrupts.

5. In a cascaded mode, the number of vectored interrupts provided by 8259A is
a) 4
b) 8

c) 16
d) 64
View Answer
Answer: d
Explanation: A single 8259A provides 8 vectored interrupts. In cascade mode, 64 vectored interrupts can be provided.

6. When the PS(active low)/EN(active low) pin of 8259A used in buffered mode, then it can be used as a
a) input to designate chip is master or slave
b) buffer enable
c) buffer disable
d) none
View Answer
Answer: b
Explanation: When the pin is used in buffered mode, then it can be used as a buffer enable to control buffer transreceivers. If it is not used in buffered mode, then the pin is used as input to designate whether the chip is used as a master or a slave.

7. Once the ICW1 is loaded, then the initialization procedure involves
a) edge sense circuit is reset
b) IMR is cleared
c) slave mode address is set to 7
d) all of the mentioned
View Answer
Answer: d
Explanation: The initialization procedure involves
i) edge sense circuit is reset.
ii) IMR is cleared.
iii) IR7 input is assigned the lowest priority.
iv) slave mode address is set to 7
v) special mask mode is cleared and the status read is set to IRR.

8. When non-specific EOI command is issued to 8259A it will automatically
a) set the ISR
b) reset the ISR
c) set the INTR
d) reset the INTR
View Answer
Answer: b
Explanation: When non-specific EOI command is issued to 8259A it will automatically reset the highest ISR.

9. In the application where all the interrupting devices are of equal priority, the mode used is
a) Automatic rotation
b) Automatic EOI mode
c) Specific rotation
d) EOI
View Answer
Answer: a
Explanation: The automatic rotation is used in the applications where all the interrupting devices are of equal priority.

1. The registers that store the keyboard and display modes and operations programmed by CPU are
a) I/O control and data buffers
b) Control and timing registers
c) Return buffers
d) Display address registers
View Answer
Answer: b
Explanation: The control and timing register to store the keyboard and display modes and other operations programmed by CPU.

2. The sensor RAM acts as 8-byte first-in-first-out RAM in
a) keyboard mode
b) strobed input mode
c) keyboard and strobed input mode
d) scanned sensor matrix mode
View Answer
Answer: c
Explanation: In this mode, each key code of the pressed key is entered in the order of the entry, and in the meantime, read by the CPU, till the RAM becomes empty.

3. The registers that hold the address of the word currently being written by the CPU from the display RAM are
a) control and timing register
b) control and timing register and timing control
c) display RAM
d) display address registers
View Answer
Answer: d
Explanation: The display address registers holds the address of the word currently being written or read by the CPU to or from the display RAM.

4. When a key is pressed, a debounce logic comes into operation in
a) scanned keyboard special error mode
b) scanned keyboard with N-key rollover
c) scanned keyboard mode with 2 key lockout
d) sensor matrix mode
View Answer
Answer: c
Explanation: In scanned keyboard mode with 2 key lockout mode of operation, when a key is pressed, a debounce logic comes into operation. During the next two scans, other keys are checked for closure and if no other key is pressed then the first pressed key is identified.

5. The mode that is programmed using “end interrupt/error mode set command” is
a) scanned keyboard special error mode
b) scanned keyboard with N-key rollover
c) scanned keyboard mode with 2 key lockout
d) sensor matrix mode
View Answer
Answer: a
Explanation: The scanned keyboard special error mode is programmed using end

interrupt/error mode set command. This mode is valid only under the N-key rollover mode.

6. When a key is pressed, the debounce circuit waits for 2 keyboard scans and then checks whether the key is still depressed in
a) scanned keyboard special error mode
b) scanned keyboard with N-key rollover
c) scanned keyboard mode with 2 key lockout
d) sensor matrix mode
View Answer
Answer: b
Explanation: In this mode, When a key is pressed, the debounce circuit waits for 2 keyboard scans and then checks whether the key is still depressed. If it is still depressed, the code is entered in FIFO RAM.

7. The data that is entered from the left side of the display unit is of
a) left entry mode
b) right entry mode
c) left and right entry modes
d) none
View Answer
Answer: a
Explanation: The data that is entered from the left side of the display unit is of left entry mode, as in a type-writer the first character typed appears at the left-most position, while the subsequent characters appear successively to the right of the first one.

8. The FIFO status word is used to indicate the error in
a) keyboard mode
b) strobed input mode
c) keyboard and strobed input mode
d) scanned sensor matrix mode
View Answer
Answer: c
Explanation: Overrun error occurs when an already full FIFO has attempted an entry. Underrun error occurs when an empty FIFO read is attempted.

9. The flag that increments automatically after each read or write operation to the display RAM is
a) IF
b) RF
c) AI
d) WF
View Answer
Answer: c
Explanation: AI refers to auto increment flag.

10. If any change in sensor value is detected at the end of a sensor matrix scan, then the IRQ line
a) goes low
b) goes high
c) remains unchanged
d) none
View Answer

Answer: b
Explanation: In sensor matrix mode, the IRQ line goes high, if any change in sensor value is detected at the end of a sensor matrix scan or the sensor RAM has a previous entry to be read by the CPU.

1. Which of the following is not a mode of data transmission?
a) simplex
b) duplex
c) semi duplex
d) half duplex
View Answer
Answer: c
Explanation: Basically, there are three modes of data transmission. simplex, duplex and half duplex.

2. If the data is transmitted only in one direction over a single communication channel, then it is of
a) simplex mode
b) duplex mode
c) semi duplex mode
d) half duplex mode
View Answer
Answer: a
Explanation: In simplex mode, the data transmission is unidirectional. For example, a CPU may transmit data for a CRT display unit in this mode.

3. If the data transmission takes place in either direction, but at a time data may be transmitted only in one direction then, it is of
a) simplex mode
b) duplex mode
c) semi duplex mode
d) half duplex mode
View Answer
Answer: d
Explanation: In half duplex mode, data transmission is bidirectional but not at a time. For example, Walkie-Talkie.

4. In 8251A, the pin that controls the rate at which the character is to be transmitted is
a) TXC(active low)
b) TXC(active high)
c) TXD(active low)
d) RXC(active low)
View Answer
Answer: a
Explanation: Transmitter Clock Input (TXC(active low)) is a pin that controls the rate at which the character is to be transmitted.

5. TXD(Transmitted Data Output) pin carries serial stream of the transmitted data bits along with
a) start bit
b) stop bit
c) parity bit
d) all of the mentioned
View Answer

Answer: d
Explanation: Transmitted Data Output pin carries a serial stream of the transmitted data bits along with other information like start bits, stop bits and parity bits etc.

6. The signal that may be used either to interrupt the CPU or polled by the CPU is
a) TXRDY(Transmitter ready)
b) RXRDY(Receiver ready output)
c) DSR(active low)
d) DTR(active low)
View Answer
Answer: b
Explanation: RXRDY(Receiver ready output) may be used either to interrupt the CPU or polled by the CPU.

7. The disadvantage of RS-232C is
a) limited speed of communication
b) high-voltage level signaling
c) big-size communication adapters
d) all of the mentioned
View Answer
Answer: d
Explanation: RS232C has been used for long and has a few disadvantages like limited speed of communication, high-voltage level signaling and big-size communication adapters.

8. The USB supports the signaling rate of
a) full-speed USB 1.0 at rate of 12 Mbps
b) high-speed USB 2.0 at rate of 480 Mbps
c) super-speed USB 3.0 at rate of 596 Mbps
d) all of the mentioned
View Answer
Answer: d
Explanation: The USB standards support the signaling rates. Also, USB signaling is implemented in a differential in low- and full-speed options.

9. The bit packet that commands the device either to receive data or transmit data in transmission of USB asynchronous communication is
a) Handshake packet
b) Token packet
c) PRE packet
d) Data packet
View Answer
Answer: b
Explanation: The token packet is the second type of packet which commands the device either to receive data or transmit data.

10. High speed USB devices neglect
a) Handshake packet
b) Token packet
c) PRE packet
d) Data packet
View Answer
Answer: c
Explanation: PRE packets are only of importance to low-speed USB devices.

**SARANATHAN COLLEGE OF ENGINEERING**

**TRICHY-12**

**Department of Electrical and Electronics Engineering**

**EE8552 POWER ELECTRONICS**

**Regulation-2013,Odd Semester**

**MULTIPLE CHOICE QUESTIONS**

1. Which of the following devices does not belong to the transistor family?
a) IGBT
b) MOSFET
c) GTO
d) BJT
View Answer
Answer: c
Explanation: GTO is gate turn off transistor, it belongs to the Thyristor family. All the other devices belong to the transistor family.

2. A power transistor is a
a) three layer, three junction device
b) three layer, two junction device
c) two layer, one junction device
d) four layer, three junction device
View Answer
Answer: b
Explanation: It has three layers p-n-p or n-p-n forming two p-n junctions.

3. In a power transistor,_____is the controlled parameter.
a) $V_{BE}$
b) $V_{CE}$
c) $I_B$
d) $I_C$
View Answer
Answer: d
Explanation: The collector current is the controlled parameter.

4. A power transistor is a_____device.
a) two terminal, bipolar, voltage controlled
b) two terminal, unipolar, current controlled
c) three terminal, unipolar, voltage controlled

d) three terminal, bipolar, current controlled
View Answer
Answer: d
Explanation: Power transistor is simply many BJT's connected in series parallel on a single silicon chip for power applications. It is a three terminal, bipolar, current controlled device.

5. In a power transistor,_____is the controlling parameter.
a) $V_{BE}$
b) $V_{CE}$
c) $I_B$
d) $I_C$
View Answer
Answer: c
Explanation: The base current controls the collector current. Hence, the base current Ib is the controlling parameter.

6. In a power transistor, the $I_B$ vs $V_{BE}$ curve is
a) a parabolic curve
b) an exponentially decaying curve
c) resembling the diode curve
d) a straight line $Y = I_B$
View Answer
Answer: c
Explanation: The B-E junction of a BJT resembles a p-n junction diode, hence the curve.

7. For a power transistor, if the base current $I_B$ is increased keeping $V_{CE}$ constant, then
a) $I_C$ increases
b) $I_C$ decreases
c) $I_C$ remains constant
d) none of the mentioned
View Answer
Answer: a
Explanation: Ic is directly proportional to Ic.

8. The forward current gain α is given by
a) $I_C/I_B$
b) $I_C/I_E$
c) $I_E/I_C$
d) $I_E/I_B$
View Answer
9. The value of β is given by the expression
a) $I_C/I_B$
b) $I_C/I_E$

c) $I_E/I_C$
d) $I_E/I_B$
View Answer
Answer: a
Explanation: Collector current by the base current is beta, its value is in the range 50 to 300.

10. A power BJT is used as a power control switch by biasing it in the cut off region (off state) or in the saturation region (on state). In the on state
a) both the base-emitter & base-collector junctions are forward biased
b) the base-emitter junction is reverse biased, and the base collector junction is forward biased
c) the base-emitter junction is forward biased, and the base collector junction is reversed biased
d) both the base-collector & the base-emitter junctions are reversed biased
View Answer
Answer: a
Explanation: When base-emitter & base-collector junctions are forward biased only than both the p-n junctions are forward biased and the device is on.

1. For a power transistor, if the forward current gain $\alpha = 0.97$, then $\beta = ?$
a) 0.03
b) 2.03
c) 49.24
d) 32.33
View Answer
Answer: d
Explanation: Use the relation $\alpha = \beta/(\beta+1)$.

2. The power electronics devices have a very high efficiency because
a) cooling is very efficient
b) the devices traverse active region at high speed & stays at the two states, on and off
c) the devices never operate in active region
d) the devices always operate in the active region
View Answer
Answer: b
Explanation: They are efficient due to their higher transition speeds.

3. For a power transistor, which of the following relations is true?
a) Ie>Ic>Ib
b) Ib>Ic>Ie
c) Ic>Ie>Ib
d) Ie=Ib
View Answer

Answer: a
Explanation: Practically speaking Ie = Ib+Ic. Ie is the highest as it is the sum of the collector and base currents. The base current is the smallest.

4. High frequency operation of any device is limited by the
a) forward voltage rating
b) switching losses
c) thermal conductivity
d) heat Sink arrangements
View Answer
Answer: b
Explanation: Lower the switching losses higher the frequency of operation of the device.

5. The instantaneous power loss during the delay time of a transistor is given by
a) Ic Vce
b) Ib Vbe
c) Ic Vbe
d) Ib Vce
View Answer
Answer: a
Explanation: During the delay time only the collector current flows & base to emitter voltage is zero.

6. For a power transistor, the average power loss during the delay time can be given by the equation
a) Ic * Vc
b) $1/T * \int^{Td}$ (Ic Vce) dt
c) Ic * dVc/dt * T
d) $1/T * \int^{(Td * Tr)}$ (Ic Vc) dt
View Answer
Answer: b
Explanation: During the delay time only, the collector current flows & base to emitter voltage is zero. Hence the average power can be found, simply by integrating it over the total delay time & dividing by the base time period.

7. A 1mv of i/p gives an output of 1V, the voltage gain as such would be
a) 0.001
b) 0.0001
c) 1000
d) 100
View Answer
Answer: c
Explanation: 1V/1mv = 1000.

8. Which of the following relations is true for a BJT?
a) Ic ≈ Ie
b) Ib ≈ Ic
c) Ie ≈ Ib
d) Ib ≈ Ie ≈ Ic
View Answer
Answer: a
Explanation: The collector & emitter current differ only by the base current, which is very very small.

9. Choose the correct statement
a) A transistor will remain on as long the the base current is applied
b) A transistor remains on after a high to low pulse is applied at the base
c) A transistor will remain on as long the the collector current is applied
d) A transistor remains on after a high to low pulse is applied at the collector
View Answer
Answer: a
Explanation: Unlike the thyristor devices, all the transistor family devices remain in the conducting state as long as the firing pulses are applied. This is a very important property of the transistor devices.

10. Let's say that a transistor is operating at the middle of the load line, then a decrease in the current gain would
a) move the Q point up
b) move the Q point down
c) result in to & fro motion of the Q point
d) not change the Q point
View Answer
Answer: b
Explanation:The current gain would decreases the collector current, shifting the Q point below.

1. The MOSFET combines the areas of_____& _____
a) field effect & MOS technology
b) semiconductor & TTL
c) mos technology & CMOS technology
d) none of the mentioned
View Answer
Answer: a
Explanation: It is an enhancement of the FET devices (field effect) using MOS technology.

2. Which of the following terminals does not belong to the MOSFET?
a) Drain

b) Gate
c) Base
d) Source
View Answer
Answer: c
Explanation: MOSFET is a three terminal device D, G & S.

3. Choose the correct statement
a) MOSFET is a uncontrolled device
b) MOSFET is a voltage controlled device
c) MOSFET is a current controlled device
d) MOSFET is a temperature controlled device
View Answer
Answer: b
Explanation: It is a voltage controlled device.

4. Choose the correct statement(s)
i) The gate circuit impedance of MOSFET is higher than that of a BJT
ii) The gate circuit impedance of MOSFET is lower than that of a BJT
iii) The MOSFET has higher switching losses than that of a BJT
iv) The MOSFET has lower switching losses than that of a BJT
a) Both i & ii
b) Both ii & iv
c) Both i & iv
d) Only ii
View Answer
Answer: c
Explanation: MOSFET requires gate signals with lower amplitude as compared to BJTs & has lower switching losses.

5. Choose the correct statement
a) MOSFET is a unipolar, voltage controlled, two terminal device
b) MOSFET is a bipolar, current controlled, three terminal device
c) MOSFET is a unipolar, voltage controlled, three terminal device
d) MOSFET is a bipolar, current controlled, two terminal device
View Answer
Answer: c
Explanation: MOSFET is a three terminal device, Gate, source & drain. It is voltage controlled unlike the BJT & only electron current flows.

6. The arrow on the symbol of MOSFET indicates
a) that it is a N-channel MOSFET
b) the direction of electrons
c) the direction of conventional current flow

d) that it is a P-channel MOSFET
View Answer
Answer: b
Explanation: The arrow is to indicate the direction of electrons (opposite to the direction of conventional current flow).

7. The controlling parameter in MOSFET is
a) Vds
b) Ig
c) Vgs
d) Is
View Answer
Answer: b
Explanation: The gate to source voltage is the controlling parameter in a MOSFET.

8. In the internal structure of a MOSFET, a parasitic BJT exists between the
a) source & gate terminals
b) source & drain terminals
c) drain & gate terminals
d) there is no parasitic BJT in MOSFET
View Answer
Answer: b
Explanation: Examine the internal structure of a MOSFET, notice the n-p-n structure between the drain & source. A p-channel MOSFET will have a p-n-p structure.

9. In the transfer characteristics of a MOSFET, the threshold voltage is the measure of the
a) minimum voltage to induce a n-channel/p-channel for conduction
b) minimum voltage till which temperature is constant
c) minimum voltage to turn off the device
d) none of the above mentioned is true
View Answer
Answer: a
Explanation: It is the minimum voltage to induce a n-channel/p-channel which will allow the device to conduct electrically through its length.

10.The output characteristics of a MOSFET, is a plot of
a) Id as a function of Vgs with Vds as a parameter
b) Id as a function of Vds with Vgs as a parameter
c) Ig as a function of Vgs with Vds as a parameter
d) Ig as a function of Vds with Vgs as a parameter
View Answer
Answer: b
Explanation: It is Id vs Vds which are plotted for different values of Vgs (gate to source voltage).

1. In the output characteristics of a MOSFET with low values of Vds, the value of the on-state resistance is
a) Vds/Ig
b) Vds/Id
c) 0
d) ∞
View Answer
Answer: b
Explanation: The o/p characteristics Is a plot of Id verses Vds, which for low values of Vds is almost constant. Hence, the on-state resistance is constant & the slop is its constant value.

2. At turn-on the initial delay or turn on delay is the time required for the
a) input inductance to charge to the threshold value
b) input capacitance to charge to the threshold value
c) input inductance to discharge to the threshold value
d) input capacitance to discharge to the threshold value
View Answer
Answer: b
Explanation: It is the time required for the input capacitance to charge to the threshold value, which depends on the device configuration. The device can start conducting only after this time.

3. Choose the correct statement
a) MOSFET suffers from secondary breakdown problems
b) MOSFET has lower switching losses as compared to other devices
c) MOSFET has high value of on-state resistance as compared to other devices
d) All of the mentioned
View Answer
Answer: b
Explanation: MOSFET has lower switching losses due to its unipolar nature & less turn off time. All of the other statements are false.

4. Which among the following devices is the most suited for high frequency applications?
a) BJT
b) IGBT
c) MOSFET
d) SCR
View Answer
Answer: c
Explanation: MOSFET has the least switching losses among the rest of the devices.

5. Choose the correct statement
a) MOSFET has a positive temperature co-efficient

b) MOSFET has a high gate circuit impedance
c) MOSFET is a voltage controlled device
d) All of the mentioned
View Answer
Answer: d
Explanation: MOSFETs are voltage controlled devices. They have high gate circuit impedance and are PTC devices.

6. Consider an ideal MOSFET. If Vgs = 0V, then Id = ?
a) Zero
b) Maximum
c) Id(on)
d) Idd
View Answer
Answer: a
Explanation: Gate current = 0 so device is off (ideally).

7. For a MOSFET Vgs=3V, Idss=5A, and Id=2A. Find the pinch of voltage Vp
a) 4.08
b) 8.16
c) 16.32
d) 0V
View Answer
Answer: b
Explanation: Use Id = Idd x $[1-Vgs/Vp]^2$.

8. How does the MOSFET differ from the JFET?
a) JFET has a p-n junction
b) They are both the same
c) JFET is small in size
d) MOSFET has a base terminal
View Answer
Answer: a
Explanation: None.

9. The basic advantage of the CMOS technology is that
a) It is easily available
b) It has small size
c) It has lower power consumption
d) It has better switching capabilities
View Answer
Answer: c
Explanation: Complementary MOS consumes very less power as compared to all the earlier devices.

10. The N-channel MOSFET is considered better than the P-channel MOSFET due to its
a) low noise levels
b) TTL compatibility
c) lower input impedance
d) faster operation
View Answer
Answer: d
Explanation: The N-channel are faster than the P-channel type.

1. IGBT possess
a) low input impedance
b) high input impedance
c) high on-state resistance
d) second breakdown problems
View Answer
Answer: b
Explanation: Like MOSFET IGBT possess high input impedance.

2. IGBT & BJT both posses ____
a) low on-state power losses
b) high on-state power losses
c) low switching losses
d) high input impedance
View Answer
Answer: a
Explanation: Low on state power loss is one of the best parameters of both BJT & the IGBT.

3. The three terminals of the IGBT are
a) base, emitter & collector
b) gate, source & drain
c) gate, emitter & collector
d) base, source & drain
View Answer
Answer: c
Explanation: IGBT is a three terminal device. It has a gate, a emitter & a collector.

4. In IGBT, the $p^+$ layer connected to the collector terminal is called as the
a) drift layer
b) injection layer
c) body layer
d) collector Layer
View Answer

Answer: b
Explanation: It is called as a injection layer, because it injects holes into the $n^-$ layer.

5. The controlling parameter in IGBT is the
a) $I_G$
b) $V_{GE}$
c) $I_C$
d) $V_{CE}$
View Answer
Answer: b
Explanation: The controlling parameter is the gate to emitter voltage, as the device is a voltage controlled device.

6. In IGBT, the $n^-$ layer above the $p^+$ layer is called as the
a) drift layer
b) injection layer
c) body layer
d) collector Layer
View Answer
Answer: a
Explanation: It is called as the drift layer because its thickness determines the voltage blocking capabilities of the device.

7. The voltage blocking capability of the IGBT is determined by the
a) injection layer
b) body layer
c) metal used for the contacts
d) drift layer
View Answer
Answer: d
Explanation: The drift layer which is a $n^-$ layer determines the voltage blocking capabilities.

8. The controlled parameter in IGBT is the
a) $I_G$
b) $V_{GE}$
c) $I_C$
d) $V_{CE}$
View Answer
Answer: c
Explanation: The controlling parameter is the gate to collector current.

9. The structure of the IGBT is a
a) P-N-P structure connected by a MOS gate
b) N-N-P-P structure connected by a MOS gate

c) P-N-P-N structure connected by a MOS gate
d) N-P-N-P structure connected by a MOS gate
View Answer
Answer: c
Explanation: The IGBT is a semiconductor device with four alternating layers (P-N-P-N) that are controlled by a metal-oxide-semiconductor (MOS) gate structure without regenerative action.

10. The major drawback of the first generation IGBTs was that, they had
a) latch-up problems
b) noise & secondary breakdown problems
c) sluggish operation
d) latch-up & secondary breakdown problems
View Answer
Answer: d
Explanation: The earlier IGBT's had latch-up problems (device cannot turn off even after the gate signal is removed), and secondary breakdown problems (in which a localized hotspot in the device goes into thermal runaway and burns the device out at high currents).

1. When latch-up occurs in an IGBT
a) Ig is no longer controllable
b) Ic is no longer controllable
c) the device turns off
d) Ic increases to a very high value
View Answer
Answer: b
Explanation: After latch-up the collector emitter current is no longer in control of the gate terminal.

2. A latched up IGBT can be turned off by
a) forced commutation of current
b) forced commutation of voltage
c) use of a snubber circuit
d) none of the mentioned
View Answer
Answer: a
Explanation: Forced commutation of current is the only way to turn off a latched up IGBT.

3. The static V-I curve of an IGBT is plotted with
a) Vce as the parameter
b) Ic as the parameter
c) Vge as the parameter

d) Ig as the parameter
View Answer
Answer: c
Explanation: V-I curves are plotted for Ic vs Vce with the controlling parameter (Vge) as a parameter.

4. Latch-up occurs in an IGBT when
a) Vce reaches a certain value
b) Ic reaches a certain value
c) Ig reaches a certain value
d) the device temperature reaches a certain value
View Answer
Answer: b
Explanation: Latch up occurs when the current through the device (Ic) collector current increases beyond a certain value.

5. In an IGBT, during the turn-on time
a) Vge decreases
b) Ic decreases
c) Vce decreases
d) none of the mentioned
View Answer
Answer: c
Explanation: Vce decreases from 0.9 to 0.1 of the initial value whereas others increase.

6. Choose the correct statement
a) IGBTs have higher switching losses as compared to BJTs
b) IGBTs have secondary breakdown problems
c) IGBTs have lower gate drive requirements
d) IGBTs are current controlled devices
View Answer
Answer: c
Explanation: Due to its high gate impedance, IGBTs require less gate drive current.

7. The approximate equivalent circuit of an IGBT consists of
a) a BJT & a MOSFET
b) a MOSFET & a MCT
c) two BJTs
d) two MOSFETs
View Answer
Answer: a
Explanation: Gate of the MOSFET forms the gate terminal of the IGBT, the source of MOSFET is connected to the base of the BJT and drain to the collector.

8. An IGBT is also know as
a) MOIGT (Metal oxide insulated gate transistor)
b) COMFET (Conductively modulated FET)
c) GEMFET (Grain modulated FET)
d) all of the mentioned
View Answer
Answer: d
Explanation: All of the above mentioned are alternate names of IGBTs.

9. The body of an IGBT consists of a
a) p-layer
b) n-layer
c) p-n layer
d) metal
View Answer
Answer: a
Explanation: IGBT has a p-n-p structure with fingers of $n^+$ layers into the p layer. The p layer has the largest cross section and forms the body of the IGBT.

10. At present, the state-of-the-art semiconductor devices are begin manufactured using
a) Semiconducting Diamond
b) Gallium-Arsenide
c) Germanium
d) Silicon-Carbide
View Answer
Answer: d
Explanation: All of the above mentioned can be used but Si-Ca has certain advantages over the other materials.

1. For a transistor, the safe operating area (SOA) is a plot of
a) Ib versus Vce
b) Ib versus Ic
c) Ic versus Vce
d) Ic versus time
View Answer
Answer: c
Explanation: For reliable operation the collector current & voltage must remain within the SOA curves.

2. The forward safe operating area (FSOA) pertains to the operation when
a) the device is fired at a 50% Duty cycle
b) the device is forward-biased
c) the device is operated on AC

d) the device is operated on DC
View Answer
Answer: b
Explanation: The FSOA is for forward biased operations. The FSOA is plotted for AC as well as DC for different duty cycles. Hence, option (b) is the most appropriate choice.

3. The SOAs are plotted always on a_____scale
a) time
b) frequency
c) logarithmic
d) polynomial
View Answer
Answer: c
Explanation: The scale is always logarithmic, irrespective of the type of device.

4. As the FSOA increases, the pulse width
a) decreases
b) increases
c) remains constant
d) vanishes
View Answer
Answer: b
Explanation: On reduced pulse width values, the devices can operated on higher voltages & currents.

5. The SOAs provided by the manufacturers are for
a) single pulse operation & a particular temperature
b) multi pulse operation & all the temperature
c) all the conditions
d) a particular duty cycle operation
View Answer
Answer: a
Explanation: The manufacturer specifies the SOAs only for single pulse DC operation & a particular temperature (usually 20Degree Centigrade Scale). For actual operations, The SOA's have to be modified using the thermal impedance charts.

6. A device is operating at Ic = 4A & Vce = 50V. For the device to operate at Ic = 20A (Without damaging),
a) voltage should be increased
b) voltage should be reduced
c) voltage can be kept constant
d) current has to increased further
View Answer

Answer: b
Explanation: For safe operation, the values should be within the limits. P = V.I – with increase in one of the values, another value should decrease.

7. For a BJT, find the maximum power dissipation when the device is safely operated at Vce = 90V and Ic = 0.5A
a) 40 Watts
b) 35 Watts
c) 45 Watts
d) 30 Watts
View Answer
Answer: c
Explanation: P=90*0.5=45Watts.

8. The SOA for a MOSFET is plotted for
a) Id versus Vds
b) Ig versus Id
c) Ig versus Vds
d) Id versus Vgs
View Answer
Answer: a
Explanation: It is a plot of drain current vs drain to source voltage.

9. The SOA for an IGBT is plotted for
a) Ic versus Vge
b) Ig versus Ic
c) Ig versus Vce
d) Ic versus Vce
View Answer
Answer: d
Explanation: It is a plot of collector current vs collector to emitter voltage.

10. For MOSFET's SOA, as the pulse width goes on increasing, the maximum voltage rating_____& current rating _____
a) is constant, increases
b) increases, decreases
c) decreases, is constant
d) constant, decreases
View Answer
Answer: c
Explanation: Refer MOSFET's SOA

1. A thyristor (SCR) is a
a) P-N-P device
b) N-P-N device

c) P-N-P-N device
d) P-N device
View Answer
Answer: c
Explanation: An SCR (silicon controlled rectifier) is a four layer p-n-p-n type device.

2. Which terminal does not belong to the SCR?
a) Anode
b) Gate
c) Base
d) Cathode
View Answer
Answer: c
Explanation: The SCR is having three terminals viz. anode, cathode and the gate.

3. An SCR is a
a) four layer, four junction device
b) four layer, three junction device
c) four layer, two junction device
d) three layer, single junction device
View Answer
Answer: b
Explanation: SCR is a four layer p-n-p-n device which forms three p-n junctions.

4. Choose the false statement.
a) SCR is a bidirectional device
b) SCR is a controlled device
c) In SCR the gate is the controlling terminal
d) SCR are used for high-power applications
View Answer
Answer: a
Explanation: It is a unidirectional device, current only flows from anode to cathode.

5. In the SCR structure the gate terminal is located
a) near the anode terminal
b) near the cathode terminal
c) in between the anode & cathode terminal
d) none of the mentioned
View Answer
Answer: b
Explanation: The gate is located near the cathode, because it allows fast turning on of the device when the gate signal is applied by forward basing the second junction.

6. The static V-I curve for the SCR is plotted for
a) Ia (anode current) vs Ig (gate current), Va (anode – cathode voltage) as a parameter

b) Ia vs Va with Ig as a parameter
c) Va vs Ig with Ia as a parameter
d) Ig vs Vg with Ia as a parameter
View Answer
Answer: b
Explanation: The curve is plotted for Ia vs Va for different values of gate current Ig.

7. If the cathode of an SCR is made positive with respect to the anode & no gate current is applied then
a) all the junctions are reversed biased
b) all the junctions are forward biased
c) only the middle junction is forward biased
d) only the middle junction is reversed biased
View Answer
Answer: c
Explanation: The device is in the reverse blocking state (3rd quadrant) & only the middle junction is forward biased whereas other two are reversed biased.

8. For an SCR in the reverse blocking mode, (practically)
a) leakage current does not flow
b) leakage current flows from anode to cathode
c) leakage current flows from cathode to anode
d) leakage current flows from gate to anode
View Answer
Answer: c
Explanation: In the reverse blocking mode, the gate current is zero & a reverse voltage is applied at the cathode-anode.

9. With the anode positive with respect to the cathode & the gate circuit open, the SCR is said to be in the
a) reverse blocking mode
b) reverse conduction mode
c) forward blocking mode
d) forward conduction mode
View Answer
Answer: c
Explanation: The SCR is in the forward blocking mode with its top and bottom junctions forward biased and the middle junction reversed biased.

10. For an SCR in the forward blocking mode (practically)
a) leakage current does not flow
b) leakage current flows from anode to cathode
c) leakage current flows from cathode to anode

d) leakage current flows from gate to anode
View Answer
Answer: b
Explanation: In the forward blocking mode, the gate current is zero & only the middle J2 junction is reversed biased.

1. The forward break over voltage is the
a) anode-cathode voltage at which conduction starts with gate signal applied
b) anode-cathode voltage at which conduction starts with no gate signal applied
c) gate voltage at which conduction starts with no anode-cathode voltage
d) gate voltage at which conduction starts with anode-cathode voltage applied
View Answer
Answer: b
Explanation: It is the forward voltage at which the middle junction breaks down without any gate signal and pushes the device into the conducting state.

2. For a forward conducting SCR device, as the forward anode to cathode voltage is increased
a) the device turns on at higher values of gate current
b) the device turns on at lower values of gate current
c) the forward impedance of the device goes on increasing
d) the forward impedance of the device goes on decreasing
View Answer
Answer: b
Explanation: Higher the value of anode-cathode forward voltage, lower the gate requirements of the device. Also, the forward resistance of the device is always constant as long as the junction temperature is constant.

3. A thyristor can be bought from the forward conduction mode to forward blocking mode by
a) the dv/dt triggering method
b) applying a negative gate signal
c) applying a positive gate signal
d) applying a reverse voltage across anode-cathode terminals
View Answer
Answer: d
Explanation: a) & c) are used to turn on the device, b) will damage the SCR.

4. Usually the forward voltage triggering method is not used to turn-on the SCR because
a) it increases losses
b) it causes noise production
c) it may damage the junction & destroy the device
d) relatively it’s an inefficient method
View Answer

Answer: c
Explanation: In forward voltage triggering the middle junction breaks down without any gate signal and pushes the device into the conducting state. This method can permanently damage the J2 junction and make the device useless.

5. Among the following, the most suitable method to turn on the SCR device is the
a) gate triggering method
b) dv/dt triggering method
c) forward voltage triggering method
d) temperature triggering method
View Answer
Answer: a
Explanation: d) & b) are unreliable methods, c) can permanently damage the SCR
Gate triggering is simple, reliable & most efficient.

6. The forward break over voltage is maximum when
a) Gate current = ∞
b) Gate current = 0
c) Gate current = -∞
d) It is independent of gate current
View Answer
Answer: b
Explanation: Higher the value of anode-cathode forward voltage, lower the gate requirements of the device.

7. For the SCR to remain in the ON (conducting) state
a) gate signal is continuously required
b) no continuous gate signal is required
c) no forward anode-cathode voltage is required
d) negative gate signal is continuously required
View Answer
Answer: b
Explanation: Unlike the transistor devices, once the SCR is turned on by the gate terminal, the gate terminal losses its control over the device.

8. The value of anode current required to maintain the conduction of an SCR even though the gate signal is removed is called as the
a) holding current
b) latching current
c) switching current
d) peak anode current
View Answer
Answer: b
Explanation: It is the minimum anode current value required to maintain the conduction

of an SCR even though the gate signal is removed. It is a very important parameter when employing an SCR in any circuit.

9. In the reverse blocking mode the middle junction ($J_2$) has the characteristics of that of a
a) transistor
b) capacitor
c) inductor
d) none of the mentioned
View Answer
Answer: b
Explanation: It is like a capacitor, as the dv/dt voltage triggering turns on the device. The charging current is given by,
$I_C = C_j dV_a/dt$.

10. _____are semiconductor thyristor devices which can be turned-on by light of appropriate wavelengths.
a) LGTOs
b) LASERs
c) MASERs
d) LASCRs
View Answer
Answer: d
Explanation: LASCR stands for light activated SCRs, which can be turned on in made to conduct by firing appropriate light pulses at its gate region.

**SARANATHAN COLLEGE OF ENGINEERING**
**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

# EE8691 EMBEDDED SYSTEMS

## Regulation 2013, Even Semester

### OBJECTIVE TYPE QUESTIONS

Computer has a built-in system clock that emits millions of regularly spaced electric pulses per__called clock cycles.
second
millisecond
microsecond
minute
Answer: a
*Explanation:* The regularly spaced electric pulses per second are referred to as the clock cycles. All the jobs performed by the processor are on the basis of clock cycles.

It takes one clock cycle to perform a basic operation.
True
False

Answer: a
*Explanation:* It takes exactly one clock cycle to perform a basic operation, such as moving a byte of memory from a location to another location in the computer.

The operation that does not involves clock cycles is _
Installation of a device
Execute
Fetch
Decode

Answer: a
*Explanation:* Normally, several clock cycles are required to fetch, execute and decode a particular program. Installation of a device is done by the system on its own.

The number of clock cycles per second is referred as
Clock speed
Clock frequency
Clock rate
Clock timing

Answer: a
*Explanation:* The number of clock cycles per second is the clock speed. It is generally measured in gigahertz($10^9$ cycles/sec) or megahertz ($10^6$ cycles/sec).
CISC stands for _____
Complex Information Sensed CPU
Complex Instruction Set Computer
Complex Intelligence Sensed CPU
Complex Instruction Set CPU

Answer: b
*Explanation:* CISC is a large instruction set computer. It has variable length instructions. It also has variety of addressing modes.

Which of the following processor has a fixed length of instructions?
CISC

RISC
EPIC
Multi-core

Answer: b
*Explanation:* The RISC which stands foraddress register. It holds the address of the active memory location.

10. A circuitry that processes that responds to and processes the basic instructions that are required to drive a computer system is
Reduced Instruction set computer has a fixed _____
length of instructions. It has a small instruction set. Also has reduced references to memory to retrieve operands.

Processor which is complex and expensive to produce is ___
RISC
EPIC
CISC
Multi-core

Answer: c
*Explanation:* CISC stands for complex instruction set computer. It is mostly used in personal computers. It has a large instruction set and a variable length of instructions.

The architecture that uses a tighter coupling between the compiler and the processor is ___
EPIC
Multi-core
RISC
CISC
Answer: a
*Explanation:* EPIC stands for Explicitly parallel instruction computing. It has a tighter coupling between the compiler and the processor. It enables the compiler to extract maximum parallelism in the original code.
MAR stands for _____
Memory address register
Main address register
Main accessible register
Memory accessible register

Answer: a
*Explanation:* The MAR stands for memory

Memory
ALU
CU
Processor

Answer: d
*Explanation:* The processor is responsible for processing the basic instructions in order to drive a computer. The primary functions of a processor are fetch, decode and execute.

## TOPIC 1.2 EMBEDDED SYSTEM DESIGN PROCESS

Which of the following allows the reuse of the software and the hardware components?
platform based design
memory design
peripheral design
input design
Answer: a
*Explanation:* The platform design allows the reuse of the software and the hardware components in order to cope with the increasing complexity in the design of embedded systems.

Which of the following is the design in which both the hardware and software are considered during the design?
platform based design
memory based design
software/hardware codesign
peripheral design

Answer: c
*Explanation:* The software/hardware codesign is the one which having both hardware and software design concerns. This

will help in the right combination of the hardware and the software for the efficient product.

What does API stand for?
address programming interface
application programming interface
accessing peripheral through interface
address programming interface
Answer: b
*Explanation:* The platform-based design helps in the reuse of both the hardware and the software components. The application programming interface helps in extending the platform towards software applications.

Which activity is concerned with identifying the task at the final embedded systems?
high-level transformation
compilation
scheduling
task-level concurrency management

Answer: d
*Explanation:* There are many design activities associated with the platforms in the embedded system and one such is the task- level concurrency management which helps in identifying the task that needed to be present in the final embedded systems.

In which design activity, the loops are interchangeable?
compilation
scheduling
high-level transformation
hardware/software partitioning
Answer: c
*Explanation:* The high-level transformation is responsible for the high optimizing transformations, that is, the loops can be interchanged so that the accesses to array components become more local.

Which design activity helps in the transformation of the floating point arithmetic to fixed point arithmetic?
high-level transformation
scheduling
compilation
task-level concurrency management

Answer: a
*Explanation:* The high-level transformation are responsible for the high optimizing transformations, that is, for the loop interchanging and the transformation of the floating point arithmetic to the fixed point arithmetic can be done by the high-level transformation.

Which design activity is in charge of mapping operations to hardware?
scheduling
high-level transformation
hardware/software partitioning
compilation

Answer: c
*Explanation:* The hardware/software partitioning is the activity which is in charge of mapping operations to the software or to the hardware.

Which of the following is approximated during hardware/software partitioning, during task-level concurrency management?
scheduling
compilation
task-level concurrency management
high-level transformation
Answer: a
*Explanation:* The scheduling is performed in several contexts. It should be approximated with the other design activities like the compilation, hardware/software partitioning, and task-level concurrency management. The scheduling should be precise for the final code.

Which of the following is a process of analyzing the set of possible designs?
design space exploration
scheduling
compilation
hardware/software partitioning

Answer: a
*Explanation:* The design space exploration is the process of analyzing the set of designs and the design which meet the specification is selected.

Which of the following is a meet-in-the- middle approach?
peripheral based design
platform based design
memory based design
processor design

Answer: b
*Explanation:* The platform is an abstraction layer which covers many possible refinements to a lower level and is mainly follows a meet-in-the-middle approach.

## TOPIC 1.3 DESIGN EXAMPLE: MODEL TRAIN CONTROLLER-DESIGN METHODOLOGIES-DESIGN FLOWS - REQUIREMENT ANALYSIS

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compilation
scheduling
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*Explanation:* The platform is an abstraction layer which covers many possible refinements to a lower level and is mainly follows a meet-in-the-middle approach.

## TOPIC 1.4 SPECIFICATIONS-SYSTEM ANALYSIS AND ARCHITECTURE DESIGN

Architectural design is a creative process satisfying only functional-requirements of a system.
True
False
Answer: b
*Explanation:* In architectural design you

design a system organization satisfying the functional and non-functional requirements of a system.

A_____view shows the system hardware and how software components are distributed across the processors in the system.
physical
logical
process
all of the mentioned

Answer: a
*Explanation:* A physical view is implemented by system engineers implementing the system hardware.

The UML was designed for describing
_____
object-oriented systems
architectural design
SRS
Both object-oriented systems and Architectural design

Answer: d
*Explanation:* The UML was designed for describing object-oriented systems and, at the architectural design stage, you often want to describe systems at a higher level of abstraction.

Which of the following view shows that the system is composed of interacting processes at run time?
physical
development
logical
process

Answer: d
*Explanation:* This view is useful for making judgments about non-functional system characteristics such as performance and availability.

Which of the following is an architectural conflict?
Using large-grain componentsimproves performance but reduces maintainability
Introducing redundant data improves availability but makes security moredifficult
Localizing safety-related features usually means more communication so degraded performance
All of the mentioned
Answer: d
*Explanation:* High availability architecture can be affected by several design factors that are required to be maintained to ensure that no single points of failure exist in such design.

Which of the following is not included in Architectural design decisions?
type of application
distribution of the system
architectural styles
testing the system

Answer: d
*Explanation:* Architectural design decisions include decisions on the type of application, the distribution of the system, the architectural styles to be used, and the ways in which the architecture should be documented and evaluated.

Architecture once established can be applied to other products as well.
True
False

Answer: b
*Explanation:* Systems in the same domain often have similar architectures that reflect domain concepts.

Which of the following pattern is the basis of interaction management in many web- based systems?
architecture
repository pattern

model-view-controller
different operatingsystem

Answer: c
*Explanation:* Model-View-Controller pattern is the basis of interaction management in many web-based systems.

What describes how a set of interacting components can share data?
model-view-controller
architecture pattern
repository pattern
none of the mentioned

Answer: c
*Explanation:* The majority of systems that use large amounts of data are organized around a shared database or repository.

Which view in architectural design shows the key abstractions in the system as objects or object classes?
physical
development
logical
process

Answer: c
*Explanation:* It is possible to relate the system requirements to entities in a logical view.

Which of the following is a type of Architectural Model?
Static structural model
Dynamic process model
Distribution model
All of the mentioned
Answer: d
*Explanation:* All these models reflects the basic strategy that is used to structure a system.

## DESIGNING WITH COMPUTING PLATFORMS

Which of the following is not included in failure costs?
rework
repair
failure mode analysis
none of the mentioned

Answer: d
*Explanation:* Failure costs are those that would disappear if no defects appeared before shipping a product to customers.

Which requirements are the foundation from which quality is measured?
Hardware
Software
Programmers
None of the mentioned

Answer: b
*Explanation:* Lack of conformance to requirements is lack of quality.

Which of the following is not a SQA plan for a project?
evaluations to be performed
amount of technical work
audits and reviews to be performed
documents to be produced by the SQA group

Answer: b
*Explanation:* All other options support a SQA plan.

Degree to which design specifications are followed in manufacturing the product is called
Quality Control
Quality of conformance
Quality Assurance
None of the mentioned
Answer: b

SARANATHAN COLLEGE OF ENGINEERING
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

**MCQ -EE6702- Protection and Switchgear**

**Year: IV/VII Sem A & B Sec**
**SEM:07** **REGULATION**: 2013
**PROGRAM**: EEE

**1. What is the purpose of back up protection?**

**a.** To increase the speed
**b.** To increase the reach
**c.** To leave no blind spot
**d.** To guard against failure of primary

**2) $SF_6$ is which type of gas?**

**a.** Electro positive
**b.** Electro negative
**c.** Both (a) and (b)
**d.** None of these

**3) For a high speed circuit breaker what will the total clearing time?**

**a.** Few minutes.
**b.** Few seconds.
**c.** 1 to 2 cycles.
**d.** 5 to 20 cycles.

**4) In a circuit breaker the contact space is ionised by what?**

**a.** Field emission from the contact surface.
**b.** Thermal emission from the contact surface.
**c.** Thermal ionisation of gas.
**d.** All of above.

**5) Which of the following should have low value for the contacts and their material?**

**a.** Thermal capacity.
**b.** Contact resistance.
**c.** Thermal conductivity.

**d.** None of above.

**6) How is the initiation of electric arc at the instant of contact separation caused?**

**a.** Thermionic emission of electrons.
**b.** Field emission of electrons.
**c.** Both (a) and (b)
**d.** None of these.

**7) The arc resistance depends on which among the following factors?**

**a.** Cross section of the arc.
**b.** Length of the arc.
**c.** Degree of ionization
**d.** All of the above.

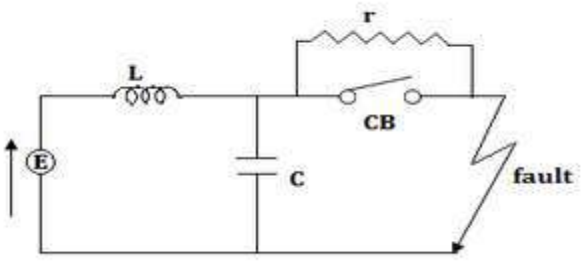
**8) What is the advantage of HRC fuses over Rewirable fuses?**

**a.** High speed operation
**b.** High rupturing capacity
**c.** No ageing effect.
**d.** All of the above.

**9) A fuse wire of circular cross section has a radius of 0.8mm. The wire blows off at a curre the radius of the wire that will blow off at a current of 1A?**

**a.** 0.2 mm
**b.** 0.18 mm
**c.** 0.28 mm
**d.** 0.3 mm

**10) In the following figure, which component ensures the safety of the line from damage?**




**a.** Relay
**b.** Circuit breaker
**c.** Bus bar
**d.** Current transformer

**1) Which of the following circuit breakers is used for the railway electrification?**

**a. Air blast circuit breaker**
**b. SF6 circuit breaker**
**c. Bulk oil circuit breaker**
**d. Minimum oil circuit breaker**

**12) The stability of arc in vacuum depends on _____.**

**a. The contact material only.**
**b. The circuit parameters only.**
**c. The contact materials and its vapour pressure.**
**d. Both (b) and (c)**
**e. None of these**

**13) What is the average rate of rise of restriking voltage upto the first peak?**

**a. 525 * 103kV / sec**
**b. 453 * 103kV / sec**
**c. 582 * 103 kV / sec**
**d. 467 * 103 kV / sec**

**14) Circuit breakers usually operate under**

**a. Steady short circuit current**
**b. Sub transient state of short circuit current**
**c. Transient state of short circuit current**
**d. None of these**

**15) What is the actuating quantity for the relays?**

**a. Magnitude**
**b. Frequency**
**c. Phase angle**
**d. All of these**

**16) Which among these are the main characteristics of a fuse element?**

**a. Low melting point**
**b. High conductivity**
**c. Least deterioration due to oxidation**
**d. All of the above**

**17) What is the making capacity of the circuit breaker?**

**a. Less than the asymmetrical breaking capacity of the breaker**
**b. Greater than the asymmetrical breaking capacity of the breaker**
**c. Equal to the asymmetrical breaking capacity of the breaker**
**d. Equal to the symmetrical breaking capacity of the breaker**

**18) A three phase, 33 kV oil circuit breaker is rated 1200 A, 2000 MVA, 3s. What is its symm current?**

**a. 1200 A**
**b. 3600 A**
**c. 35 kA**
**d. 104.8 kA**

**19) What should be the value of fusing factor?**

**a. Equal to zero**
**b. Equal to one**
**c. Less than one**
**d. More than one**

**20) What is the relation between the fusing current and the diameter of the wire?**

**a. I = k d3**
**b. I = k d3/2**
**c. I = k d2**
**d. I = k d2/3**

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**EE6703 – Special Electrical Machines**

**Regulation 2013, Odd Semester**

**Multiple Choice Questions**

**1.** Which of the following is NOT an advantage of stepper motors?
A. Cost-efficient
B. Maintenance-free
C. No feedback
**D. More complex circuitry**

**2. A pulse can be produce by which means ?**
A. Microprocessor
B. Timing Logic
C. Toggle Switch
**D. All of the above**

3. Which of the following is not a type of stepper motor?
A. Variable Reluctance
B. Hybrid
C. Magnetic
**D. Lead-Screw**

4. What is the difference between full-step and half-step?
A. In full-step two phases are on and in half-step only one phase is on.
B. More resonance is evident in half-step
C. More power required for full-step
**D. Half-step offers better resolution**

5. **How does a Stepper Motor move?**
**A.Electrical Pulse**
B.Continuous Applied Voltage
C. Alternates from A and B

**6.** With a stator having 8 teeth and a rotor having 6 teeth, what step angle will an application be able to achieve?
**A. 15°**
B. 51°
C. 20°
D. 105°

**7.** If an application using a stepper motor required feedback, which device would be needed to accomplish this?

A. Counter
**B. Encoder**

C. Linear Guide
D. Commutator

8. Which type of single-phase motor is relatively free from mechanical and ,agnetic vibrations?
A. Universal motor
**B. Hysteresis motor**
C. Shaded pole motor
D. Reluctance motor

9. The motor having a smooth chrome-steel cylindrical as its rotor with no rotor winding is
A. Universal motor
**B. Hysteresis motor**
C. Repulsion motor
D. Reluctance motor

10. The direction of rotation of hysteresis motor is determined by the
A. resistivity if the rotor material
B. amount of hysteresis
C. permeability of rotor material
**D. position of shaded pole w.r.t main pole**

11. The position of the shaded pole with respect to the main pole determines the
A. directon of a split-phase motor
B. direction of flow of current
**C. direction of rotation of hysteresis motor**
D. direction of rotation of squirrel cage motor.

12. For a reluctance motor, the maximum average torque occurs when δ = _____
**a) 45°**
b) 90°
c) 0°
d) 180°

13. Reluctance motors are singly-excited.
**a) True**
b) False

14. Reluctance motor can produce torque at _____
a) any speed less than synchronous speed
**b) synchronous speed only**
c) any speed greater than synchronous speed
d) all of the mentioned

15. Which of the following motor is preferred for tape recorder?
A.Reluctance motor
**B.Hysteresis motor**
C.Universal motor
D.Split phase motor.

16. The single phase reluctance machine acts as a generator when angle δ is _____
a) positive
**b) negative**
c) zero
d) any of the mentioned

17. Which of the following are applications of singly excited magnetic systems?
a) electromagnets, relays
b) moving-iron instruments
c) reluctance motors
**d) all of the mentioned**

18. SRM stands for?
A. Synchronous reluctance motor
B. Stepper reluctance motor
**C. Switched reluctance motor**
D. Simple reluctance motor

19. Synchronous reluctance motors have an equal number of stator and rotor poles

**A. TRUE**
B. FALSE
C. Can be true and false
D. Can not say

20. What is the angle between stator direct axis and quadrature axis?

A. 0
B. 45
**C. 90**
D. 180

21. The variation of reluctance Rl with space angle θr depends on the shape of _____

A. stator poles
B. rotor poles
C. stator or rotor poles
**D. both stator and rotor poles**

22. Single phase reluctance motors are extensively used in _____

A. grinder applications
**B. driving electric clocks and other timing devices**
C. welding applications
D. lifts/ elevators

23.The Hall effect sensor is used as the rotor position sensor for the BLDC motor.
**A.True**
B.False

24. In BLDC motor armature windings are placed on the stator side.
**A.True**
B.False

25. BLDC motor is analogous to_____
**A. Permanent magnet synchronous motor**
B.DC motor
C.Rotating Transformer
D.Single-phase Induction motor.

26. The speed of a BLDC motor can be controlled by _____

**A. Changing input Dc voltage**
B. Changing temperature
C. Changing wind direction
D. Cannot be controlled

27. Which are the advantages of BLDC motor?
i) Low cost
ii) Simplicity
iii) Reliability
iv) Good Performance

**A. i), ii), iii), iv)**
B. i), ii)
C. i), ii), iv)
D. ii),iii), iv)

28. Which type of field winding required in PMMDC?
a) series winding
b) shunt winding
c) cumulative winding
**d) none of the mentioned**

29. PMMDC are smaller in size due to _____
**a) absence of field winding**
b) presence of smaller field winding
c) present of magnets
d) Any of the mentioned

30. A PMMDC motor has an armature resistance of 4.2 ohms. When 6 V supply is applied to motor it runs at 1215 rpm drawing 14.5 mA on no-load. The rotational losses is?
**a) 86.1 mW**
b) 86.1 W
c) 8.6 W
d) 8.6 mW

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# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**IC6501- CONTROL SYSTEMS**
**OBJECTIVE TYPE QUESTIONS**
**Regulation: 2013, Odd Semester**

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1. In an open loop control system
(a) Output is independent of control input
(b) Output is dependent on control input
(c) Only system parameters have effect on the control output
(d) None of the above
**Ans: a**

2. For open control system which of the following statements is incorrect ?
(a) Less expensive
(b) Recalibration is not required for maintaining the required quality of the output
(c) Construction is simple and maintenance easy
(d) Errors are caused by disturbances
**Ans: b**

3. A control system in which the control action is somehow dependent on the output is known as
(a) Closed loop system
(b) Semiclosed loop system
(c) Open system
(d) None of the above
**Ans: a**

4. In closed loop control system, with positive value of feedback gain the overall gain of the system will
(a) decrease
(b) increase
(c) be unaffected
(d) any of the above
**Ans: a**

5. Which of the following is an open loop control system ?
(a) Field controlled D.C. motor
(b) Ward leonard control
(c) Metadyne
(d) Stroboscope
**Ans: a**

6. Which of the following statements is not necessarily correct for open control system ?
(a) Input command is the sole factor responsible for providing the control action
(b) Presence of non-linearities causes malfunctioning
(c) Less expensive
(d) Generally free from problems of non-linearities

Ans: b

7. In open loop system
(a) the control action depends on the size of the system
(b) the control action depends on system variables
(c) the control action depends on the input signal
(d) the control action is independent of the output
Ans: d

8 has tendency to oscillate.
(a) Open loop system
(b) Closed loop system
(c) Both (a) and (b)
(d) Neither (a) nor (b)
Ans: b

9. A good control system has all the following features except
(a) good stability
(b) slow response
(c) good accuracy
(d) sufficient power handling capacity
Ans: b

10. A car is running at a constant speed of 50 km/h, which of the following is the feedback element for the driver ?
(a) Clutch
(b) Eyes
(c) Needle of the speedometer
(d) Steering wheel
(e) None of the above
Ans: c

11. The initial response when the output is not equal to input is called
(a) Transient response
(b) Error response
(c) Dynamic response
(d) Either of the above
Ans: a

12. A control system working under unknown random actions is called
(a) computer control system
(b) digital data system
(c) stochastic control system
(d) adaptive control system
Ans: c

13. An automatic toaster is a_____loop control system.
(a) open
(b) closed
(c) partially closed
(d) any of the above
Ans: a

14. Any externally introduced signal affecting the controlled output is called a
(a) feedback
(b) stimulus
(c) signal
(d) gain control
Ans: b

15. A closed loop system is distinguished from open loop system by which of the following ?
(a) Servomechanism
(b) Feedback
(c) Output pattern
(d) Input pattern
Ans: b

16 is a part of the human temperature control system.
(a) Digestive system
(b) Perspiration system
(c) Ear
(d) Leg movement
Ans: b

17. By which of the following the control action is determined when a man walks along a path ?
(a) Brain
(b) Hands
(c) Legs
(d) Eyes
Ans: d

18 is a closed loop system.
(a) Auto-pilot for an aircraft
(6) Direct current generator
(c) Car starter
(d) Electric switch
Ans: a

19. Which of the following devices are commonly used as error detectors in instruments ?
(a) Vernistats

(b) Microsyns
(c) Resolvers
(d) Any of the above
Ans: d

20. Which of the following should be done to make an unstable system stable ?
(a) The gain of the system should be decreased
(b) The gain of the system should be increased
(c) The number of poles to the loop transfer function should be increased
(d) The number of zeros to the loop transfer function should be increased
Ans: b

21 increases the steady state accuracy.
(a) Integrator
(b) Differentiator
(c) Phase lead compensator
(d) Phase lag compensator
Ans: a

22. A.C. servomotor resembles
(a) two phase induction motor
(b) Three phase induction motor
(c) direct current series motor
(d) universal motor
Ans: a

23. As a result of introduction of negative feedback which of the following will not decrease ?
(a) Band width
(b) Overall gain
(c) Distortion
(d) Instability
Ans: a

24. Regenerative feedback implies feedback with
(a) oscillations
(b) step input
(c) negative sign
(d) positive sign
Ans: d

25. The output of a feedback control system must be a function of
(a) reference and output
(b) reference and input
(e) input and feedback signal
(d) output and feedback signal

Ans: a

26 is an open loop control system.
(a) Ward Leonard control
(b) Field controlled D.C. motor
(c) Stroboscope
(d) Metadyne
Ans: b

27. A control system with excessive noise, is likely to suffer from
(a) saturation in amplifying stages
(b) loss of gain
(c) vibrations
(d) oscillations
Ans: a

28. Zero initial condition for a system means
(a) input reference signal is zero
(b) zero stored energy
(c) ne initial movement of moving parts
(d) system is at rest and no energy is stored in any of its components
Ans: d

29. Transfer function of a system is used to calculate which of the following ?
(a) The order of the system
(b) The time constant
(c) The output for any given input
(d) The steady state gain
Ans: c

30. The band width, in a feedback amplifier.
(a) remains unaffected
(b) decreases by the same amount as the gain increase
(c) increases by the sane saaaajajt as the gain decrease
(d) decreases by the same amount as the gain decrease
Ans: c

31. On which of the following factors does the sensitivity of a closed loop system to gain changes and load disturbances depend ?
(a) Frequency
(b) Loop gain
(c) Forward gain
(d) All of the above
Ans: d

32. The transient response, with feedback system,

(a) rises slowly
(b) rises quickly
(c) decays slowly
(d) decays quickly
Ans: d

33. The second derivative input signals modify which of the following ?
(a) The time constant of the system
(b) Damping of the system
(c) The gain of the system
(d) The time constant and suppress the oscillations
(e) None of the above
Ans: d

34. Which of the following statements is correct for any closed loop system ?
(a) All the co-efficients can have zero value
(6) All the co-efficients are always non-zero
(c) Only one of the static error co-efficients has a finite non-zero value
(d) None of the above
Ans: c

35. Which of the following statements is correct for a system with gain margin close to unity or a phase margin close to zero ?
(a) The system is relatively stable
(b) The system is highly stable
(c) The system is highly oscillatory
(d) None of the above
Ans: c

36. Due to which of the following reasons excessive bond width in control systems should be avoided ?
(a) It leads to slow speed of response
(b) It leads to low relative stability
(c) Noise is proportional to band width
(d) None of the above
Ans: c

37. In a stable control system backlash can cause which of the following ?
(a) Underdamping
(b) Overdamping
(c) Poor stability at reduced values of open loop gain
(d) Low-level oscillations
Ans: d

38. In an automatic control system which of the following elements is not used ?
(a) Error detector

(b) Final control element
(c) Sensor
(d) Oscillator
Ans: d

39. In a control system the output of the controller is given to
(a) final control element
(b) amplifier
(c) comparator
(d) sensor
(e) none of the above
Ans: a

40. A controller, essentially, is a
(a) sensor
(b) clipper
(c) comparator
(d) amplifier
Ans: c

41. Which of the following is the input to a controller ?
(a) Servo signal
(b) Desired variable value
(c) Error signal
(d) Sensed signal
Ans:

42. The on-off controller is a_____system.
(a) digital
(b) linear
(c) non-linear
(d) discontinuous
Ans:

43. The capacitance, in force-current analogy, is analogous to
(a) momentum
(b) velocity
(c) displacement
(d) mass
Ans: d

44. The temperature, under thermal and electrical system analogy, is considered analogous to
(a) voltage
(b) current
(c) capacitance

(d) charge
(e) none of the above
Ans: a

45. In electrical-pneumatic system analogy the current is considered analogous to
(a) velocity
(b) pressure
(c) air flow
(d) air flow rate
Ans: d

46. In liquid level and electrical system analogy, voltage is considered analogous to
(a) head
(b) liquid flow
(c) liquid flow rate
(d) none of the above
Ans: a

47. The viscous friction co-efficient, in force-voltage analogy, is analogous to
(a) charge
(b) resistance
(c) reciprocal of inductance
(d) reciprocal of conductance
(e) none of the above
Ans: b

48. In force-voltage analogy, velocity is analogous to
(a) current
(b) charge
(c) inductance
(d) capacitance
Ans: a

49. In thermal-electrical analogy charge is considered analogous to
(a) heat flow
(b) reciprocal of heat flow
(c) reciprocal of temperature
(d) temperature
(e) none of the above
Ans: d

50. Mass, in force-voltage analogy, is analogous to
(a) charge
(b) current
(c) inductance
(d) resistance

Ans: c

51. The transient response of a system is mainly due to
(a) inertia forces
(b) internal forces
(c) stored energy
(d) friction
Ans: c

52 signal will become zero when the feedback signal and reference signs are equal.
(a) Input
(b) Actuating
(c) Feedback
(d) Reference
Ans: b

53. A signal other than the reference input that tends to affect the value of controlled variable is known as
(a) disturbance
(b) command
(c) control element
(d) reference input
Ans: a

54. The transfer function is applicable to which of the following ?
(a) Linear and time-in variant systems
(b) Linear and time-variant systems
(c) Linear systems
(d) Non-linear systems
(e) None of the above
Ans: a

55. From which of the following transfer function can be obtained ?
(a) Signal flow graph
(b) Analogous table
(c) Output-input ratio
(d) Standard block system
(e) None of the above
Ans: a

56 is the reference input minus the primary feedback.
(a) Manipulated variable
(b) Zero sequence
(c) Actuating signal
(d) Primary feedback
Ans: c

57. The term backlash is associated with
(a) servomotors
(b) induction relays
(c) gear trains
(d) any of the above
Ans:

58. With feedback_____ increases.
(a) system stability
(b) sensitivity
(c) gain
(d) effects of disturbing signals
Ans: a

59. By which of the following the system response can be tested better ?
(a) Ramp input signal
(b) Sinusoidal input signal
(c) Unit impulse input signal
(d) Exponentially decaying signal
Ans: c

60. In a system zero initial condition means that
(a) The system is at rest and no energy is stored in any of its components
(b) The system is working with zero stored energy
(c) The system is working with zero reference signal
Ans: a

61. In a system low friction co-efficient facilitates
(a) reduced velocity lag error
(b) increased velocity lag error
(c) increased speed of response
(d) reduced time constant of the system
Ans: a

62. Hydraulic torque transmission system is analog of
(a) amplidyne set
(b) resistance-capacitance parallel circuit
(c) motor-generator set
(d) any of the above
Ans:

63. Spring constant in force-voltage analogy is analogous to
(a) capacitance
(b) reciprocal of capacitance
(c) current

(d) resistance
Ans: b

64. The frequency and time domain are related through which of the following?
(a) Laplace Transform and Fourier Integral
(b) Laplace Transform
(c) Fourier Integral
(d) Either (b) or (c)
Ans: a

65. An increase in gain, in most systems, leads to
(a) smaller damping ratio
(b) larger damping ratio
(c) constant damping ratio
(d) none of the above
Ans: a

66. Static error co-efficients are used as a measure of the effectiveness of closed loop systems for specified _____input signal.
(a) acceleration
(b) velocity
(c) position
(d) all of the above
Ans: d

67. A conditionally stable system exhibits poor stability at
(a) low frequencies
(b) reduced values of open loop gain
(c) increased values of open loop gain
(d) none of the above
Ans: b

68. The type 0 system has_____at the origin.
(a) no pole
(b) net pole
(c) simple pole
(d) two poles
(e) none of the above
Ans: a

69. The type 1 system has_____at the origin.
(a) no pole
(b) net pole
(c) simple pole
(d) two poles
Ans: c

70. The type 2 system has at the origin.
(a) no net pole
(b) net pole
(c) simple pole
(d) two poles
Ans: d

71. The position and velocity errors of a type-2 system are
(a) constant, constant
(b) constant, infinity
(c) zero, constant
(d) zero, zero
Ans: c

72. Velocity error constant of a system is measured when the input to the system is unit _____function.
(a) parabolic
(b) ramp
(c) impulse
(d) step
Ans: b

73. In case of type-1 system steady state acceleration is
(a) unity
(b) infinity
(c) zero
(d) 10
Ans: b

74. If a step function is applied to the input of a system and the output remains below a certain level for all the time, the system is
(a) not necessarily stable
(b) stable
(c) unstable
(d) always unstable
(e) any of the above
Ans: a

75. Which of the following is the best method for determining the stability and transient response ?
(a) Root locus
(b) Bode plot
(c) Nyquist plot
(d) None of the above
Ans: a

76. Phase margin of a system is used to specify which of the following ?
(a) Frequency response
(b) Absolute stability
(c) Relative stability
(d) Time response
Ans: c

77. Addition of zeros in transfer function causes which of the following ?
(a) Lead-compensation
(b) Lag-compensation
(c) Lead-lag compensation
(d) None of the above
Ans: b

78. technique is not applicable to nonlinear system ?
(a) Nyquist Criterion
(b) Quasi linearization
(c) Functional analysis
(d) Phase-plane representation
Ans: a

79. In order to increase the damping of a badly underdamped system which of following compensators may be used ?
(a) Phase-lead
(b) Phase-lag
(c) Both (a) and (b)
(d) Either (a) and (b)
(e) None of the above
Ans: a

80. The phase lag produced by transportation relays
(a) is independent of frequency
(b) is inverseh'proportional to frequency
(c) increases linearly with frequency
(d) decreases linearly with frequency
Ans: c

81. In a stable control system saturation can cause which of the following ?
(a) Low-level oscillations
(b) High-level oscillations
(c) Conditional stability
(d) Overdamping
Ans: a

82. Which of the following can be measured by the use of a tacho-generator ?

(a) Acceleration
(b) Speed
(c) Speed and acceleration
(d) Displacement
(e) None of the above
Ans: b

83 is not a final control element.
(a) Control valve
(b) Potentiometer
(c) Electro-pneumatic converter
(d) Servomotor
Ans: b

84. Which of the following is the definition of proportional band of a controller ?
(a) The range of air output as measured variable varies from maximum to minimum
(b) The range of measured variables from set value
(c) The range of measured variables through which the air output chan¬ges from maximum to minimum
(d) Any of the above
(e) None of the above
Ans: c

85. In pneumatic control systems the control valve used as final control element converts
(a) pressure signal to electric signal
(b) pressure signal to position change
(c) electric signal to pressure signal
(d) position change to pressure signal
(e) none of the above
Ans: b

86. Pressure error can be measured by which of the following ?
(a) Differential bellows and straingauge
(b) Selsyn
(c) Strain gauge
(d) Strain gauge and potentiometer
Ans: a

87. Which of the following devices is used for conversion of co-ordinates ?
(a) Microsyn
(b) Selsyn
(c) Synchro-resolver
(d) Synchro-transformer
Ans: c

88. The effect of error damping is to
(a) provide larger settling lime
(b) delay the response
(c) reduce steady state error
(d) any of the above
(e) none of the above
Ans: c

89 technique gives quick transient and stability response
(a) Root locus
(b) Bode
(c) Nyquist
(d) Nichols
Ans: a

90. A phase lag lead network introduces in the output
(a) lag at all frequencies
(b) lag at high frequencies and lead at low frequencies
(c) lag at low frequencies and lead at high frequencies
(d) none of the above
Ans: c

91. Which of the following is the non-linearity caused by servomotor ?
(a) Static friction
(b) Backlash
(c) Saturation
(d) None of the above
Ans: c

92 can be extended to systems which are time-varying ?
(a) Bode-Nyquist stability methods
(b) Transfer functions
(c) Root locus design
(d) State model representatives
Ans: d

93. When the initial conditions of a system are specified to be zero it implies that the system is
(a) at rest without any energy stored in it
(b) working normally with reference input
(c) working normally with zero reference input
(d) at rest but stores energy
Ans: d

94. Which of the following is an electromechanical device ?
(a) Induction relay

(b) Thermocouple
(c) LVDT
(d) Any of the above
(e) None of the above
Ans: c

95. A differentiator is usually not a part of a control system because it
(a) reduces damping
(b) reduces the gain margin
(c) increases input noise
(d) increases error
Ans: c

96. If the gain of the critical damped system is increased it will behave as
(a) oscillatory
(b) critically damped
(c) overdamped
(d) underdamped
(e) none of the above
Ans: d

97. In a control system integral error compensation _____ steady state error
(a) increases
(b) minimizes
(c) does not have any effect on
(d) any of the above
Ans: b

98. With feed back_____reduces.
(a) system stability
(6) system gain
(c) system stability and gain
(d) none of the above
Ans: b

99. An amplidyne can give which of the following characteristics ?
(a) Constant current
(b) Constant voltage
(c) Constant current as well as constant voltage
(d) Constant current, constant voltage and constant power
(e) None of the above
Ans: d

100. Which of the following can be measured byLVDT?
(a) Displacement
(b) Velocity

(c) Acceleration
(d) Any of the above
Ans: d

101 directly converts temperature into voltage.
(a) Thermocouple
(b) Potentiometer
(c) Gear train
(d) LVDT
(e) None of the above
Ans: a

102. The transfer function technique is considered as inadequate under which of the following conditions ? (a) Systems having complexities and non-linearities
(b) Systems having stability problems
(c) Systems having multiple input dis¬turbances
(d) All of the above
Ans: d

103. Which of the following is the output of a thermocouple ?
(a) Alternating current
(b) Direct current
(c) A.C. voltage
(d) D.C. voltage
(e) None of the above
Ans: d

104. A.C. servomotor is basically a
(a) universal motor
(b) single phase induction motor
(c) two phase induction motor
(d) three phase induction motor
Ans: c

105. The first order control system, which is well designed, has a
(a) small bandwidth
(b) negative time constant
(c) large negative transfer function pole
(d) none of the above
Ans: c

106. Which of the following is exhibited by Root locus diagrams ?
(a) The poles of the transfer function for a set of parameter values
(b) The bandwidth of the system
(c) The response of a system to a step input
(d) The frequency response of a system

(e) None of the above
Ans: a

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

## EE 6603 – Power System Operation and Control

## Regulation 2013,Even Semester

## Multiple Choice Questions

OBJECTIVE QUESTIONS:

FILL UP THE BANKS:

UNIT-1

1. The frequency of the power system controls the_____.
2. Single control area fitted with proportional plus integral controller is_____.
3. The synchronizing coefficient between two area of a 2 area power system is_____.
4. If the two generators have individual ratings of 10MW each & a system load of 16 MW should be share as_____.
5. Load frequency control uses_____.

UNIT-2

1. The specified variables at PQ buses are_____.
2. In case of transmission line the capacitance is a_____.
3. Series Capacitors are used to_____.
4. Synchronous motor can operate at_____.
5. Under heavy loading condition , the receiving end bus should be_____.

UNIT-III:

1. The unit of heat rate is_____.
2. The unit of langrangian multiplier ʈ is_____.
3. For a slack bus ,the penalty factor is_____.
4. Incremental transmission lloss of grid is_____.
5. IFC is given by_____.

UNIT-IV:

1. The constraint equation in computing economic criteria is given by_____.
2. The units can be started within a short duration of time to meet the change in load when a particular unit fails in the power system is called_____.
3. The constraints placed on the system operation by reliability considerations the system will be operated most_____.
4. The unit is running it should not be turned off immediately this is called as_____
5. Whatare the methods of finding economic dispatch_____.

UNIT-V:

1. Define SCADA_____.
2. Application of SCADA reduce_____.
3. State estimation uses techniques like_____.
4. State the functions of energy control center_____.
5. State the functions of load dispatch center_____.

MULTIPLE CHOICE QUESTIONS: UNIT-1

1. In load flow analysis, the load connected at a bus is represented as ( )
    a. Constant current drawn from the bus

    b. Constant impedance connected at the bus

    c. Voltage and frequency dependent source at the bus

    d. Constant real and reactive drawn from the bus

Ans c

2. Two power plants A and B are inter connected by a ( )

    a. Long line b.short line c.both d.none

Ans d

3.In the single area case we could thus represent the frequency deviations by the ( )

    a. Single variable b.two variable

    b. Three variable d.four variable

Ans.a

3. Power transmitted from the area 1 is equation ( )

a. A.power equation b.torque

b. C.current d.all

Ans.a

4. All quantities other than frequency are in ( )

a.p.u b.apm d.volt d.ohm Ans.a

UNIT-2

1.. Shunt capacitors ( )

a. Fixed capacitor is connected across a load

b. At a consumers premises c. both d. none

Ans.c

3. An excitation system should have ( )

a. Low time constant b. high transient response c. high reliability d. all the above Ans.d

4. A power system needs injection of VARS ( )

   a. At peak load b. at off-peak load c. both (a) & (b) none

Ans.c

5. The change in reactive power at a bus have a great effect on the voltage magnitude ( )

   a. Of that bus b. of distant busses c. of all the busses d. none

Ans.a

5. The injection of reactive power is needed ( )

   a. To get a good voltage profile b. to increase the voltage at the receiving end

   b. To compensate for line losses. D. to supply a part of active power requirement of the load. Ans.a

UNIT-3

1. Equality constraints are ( )

   a. Generator constrains b. Current constraints

   b. Magnetic constraints d. none of the above Ans a

2. Heat rate curve is defined as ( )

   a. Fuel i/p to the power o/p  b.Power o/p to the fuel i/p

   b. Both  d.none of the above

Ans a

3. Optimal operation of generator is ( )

   a.To maximize the total cost  b.To minimize the total cost

   c. Both  d.all the above

Ans c

4. The fuel cost is included in ( )

   a. Annual fived cost  b. Annual operating cost  c.. Both (a) & (b)  d. None  Ans.b

5. The penalty factor ( )

   a. Is always less than 1. B.is always more than 1  c. may be more or less than 1.  D. is equal to 1 or less than 1.

Ans .b

UNIT -4

1. Operation of the system the having ( )

   a. Hydro b.Thermal

   c.both d.none

Ans.c

2. The hydroelectric project consists of ( )

   a. Body of water impounded by a dam b. body of water impounded by a station

   c.both d.All of the above

Ans.a

3. The water level bay is influenced by flow out of the ( )

   a.reservoir b.dam

   c.hydroplant d.none

Ans: b

4. The run off river plants have very high firm capacity ( )

    a. True b. False

Ans.b

5. The units for heat rate are ( )

    a. K cal/kwh b.kwh/k cal c.k cal/hour d.kw

Ans.a

UNIT -5

1. Electrical energy can be stored in large amounts False

2. Load forecasting is done only for long term. False

3. Application of SCADA reduce man power requirement. True 4. SCADA is used only by utilities and not in any industry. False.

4. State estimation uses techniques like weighted least square method. True

GATE:

1. The fuel cost functions of two power plants are

Where, Pg1 and Pg2 are the generated powers of two plants, and A and B are the constants. If the two plants optimally share 1000 MW load at incremental fuel cost of 100 Rs/MWh, the ratio of load shared by plants P1 and P2 is (A) 1:4 (B) 2:3 (C) 3:2 (D) 4:1

2. A 50 Hz generating unit has H-constant of 2 MJ/MVA. The machine is initially operating in steady state at synchronous speed, and producing 1 pu of real power. The initial value of the rotor angle δ is 5 , when a bolted three phase to ground short circuit fault occurs at the terminal of the generator. Assuming the input mechanical power to remain at 1 pu, the value of δ in degrees, 0.02 second after the fault is_____..

3. A load center of 120MW derives power from two power stations connected by 220kV transmission lines of 25km and 75km as shown in the figure below. The three generators G1,G2 and G3 are of 100MW capacity each and have identical fuel cost characteristics. The minimum loss generation schedule for supplying the 120 MW load is

(A).P1 80MW losses P2 20MW P3 20MW (B) P1 60MW P2 30MW losses P3 30MW

© P1 40MW P2 40MW P3 40MW losses (D) P1 30MW losses P2 45MW P3 45MW

XIV. LIST OF TOPICS FOR STUDENT SEMINARS:

1. Optimal operation of generators in Thermal power stations
2. Optimal generation allocation including the effect of transmission line losses
3. Hydroelectric power plant models
4. Modeling of Excitation system
5. Necessity of frequency constant
6. Block diagram representation of an isolated power system
7. Load frequency control of two-area system
8. Proportional plus integral control of single area and its block diagram representation

XV. CASE STUDIES / SMALL PROJECTS

1. Load frequency control and Economic dispatch control

2. Overview of Reactive power control

3. Reactive power compensation in transmission system

4. Specifications of load compensator

5. Uncompensated and compensated transmission lines

6. Shunt and series compensation

7. General transmission line loss formula

# SARANATHAN COLLEGE OF ENGINEERING

## Department of Electrical and Electronics Engineering

## 3.2.1 Assessment Process

## MCQ Online Questions

## R-2017

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**MCQ TYPE QUESTIONS**
**EC8353-ELECTRON DEVICES AND CIRCUITS**
**Regulation: 2017, Odd Semester**

**Year/Sem: II/ III**

1) Calculate the maximum frequency of the diode, whose reverse recovery time is 9ns .....
   a) 1.01THz
   b) 1THz
   c) 1.11THz
   d) 1.11KHz
   Ans: c
2) When a reverse bias applied to PN junction diode, the reverse saturation current at room temperature is 0.3μA.Determine the current flowing through the diode, when 0.15V forward bias is applied at room temperature.
   a) 95μA
   b) 90μA
   c) 90.55μA
   d) 85μA
   Ans:a
3) A silicon diode Io=7.5 μA at 300K.Calculate Io at 400K .....
   a) 7mA
   b) 6.5mA
   c) 7.68mA
   d) 6.7mA
   Ans:c
4) A 230V/46V, 50Hz centre tapped transformer used in full wave rectifier having a load of 900Ω. Determine the peak inverse voltage across each diode.
   a) 65.05V
   b) 60V
   c) 15V
   a) 50.55V
   Ans: a
5) For a transistor in CE configuration, collector current is 1.62mA and Emitter current is 1.67mA. Determine β.
   a) 30.12
   b) 22.05
   c) 35.21
   d) 32.33
   Ans:d
6) When a reverse gate voltage of 12V is applied to JFET, the gate current is 1nA.Determine the resistance between the gate and source.
   a) 10,000MΩ
   b) 15,000MΩ
   c) 12,000MΩ
   d) 13,000MΩ
   Ans: c
7) Which of the following is not a physical component of an electronic circuit?
   a) Capacitor
   b) Inductor
   c) Diode
   d) Temperature
   Ans: d
8) What is the effect of temperature on the recombination rate of electrons in electronic circuits?
   a) Recombination rate increases with increase in the temperature
   b) Recombination rate decreases with increase in the temperature

c) Recombination rate is independent of temperature
c) Recombination of electrons doesn't occur in semiconductors

Ans: b

9) Which of the following is the correct relationship between doping concentration (D) and depletion layer width (W) of a P-N junction in electronic circuits?
a) $W \propto D^{-3/2}$
b) $W \propto D^{-1/2}$
c) $W \propto D$
d) $W \propto D^{2}$

Ans: b

10) What type of semiconductor is used in LED electronic circuits?
a) Intrinsic semiconductor
b) Compound semiconductor
c) Degenerated semiconductor
d) Compensated semiconductor

Ans: b

11) What is the full form of MOSFET used in electronic devices?
a) Metal Oxide System Field Effect Transistor
b) Metal Oxide Silicon Field Energy Transistor
c) Metal Oxygen Silicon Field Effect Transistor
d) Metal Oxide Silicon Field Effect Transistor

Ans: d

12) Based on operational mode, how many types of MOSFET are used in electronic devices?
a) 5
b) 4
c) 3
d) 2

Ans: d

13) In which region does BJT act as the amplifier electronic device?
a) Cut-off
b) Saturation
c) Active
d) Reverse saturation

Ans: c

14) Which of the following diode is used in adjustable band pass filter electronic circuits?
a) Zener diode
b) Varactor diode
c) Tunnel diode
d) Schottky diode

Ans: b

15) Which of the following is true about Zener diode?
a) It is mostly used in voltage regulator electronic circuits
b) It is lightly doped
c) It is used in forward bias
d) It has avalanche breakdown

Ans: a

16) Q point can be set to work on active region requires particular conditions. What are they?
a) BE reverse biased and BC forward biased
b) BE reverse biased and BC reverse biased
c) BE forward biased and BC reverse biased
d) BE forward biased and BC forward biased

Ans: c

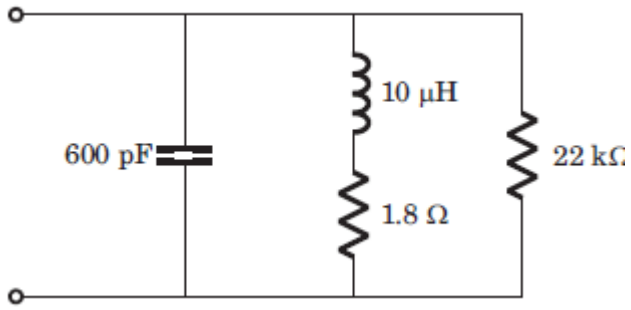
17) The bias point of a transistor occurs when the supply voltage exceeds the breakdown voltage of a transistor.
a) True
b) False

Ans: b

18) For a Voltage divider bias circuit, having R1=R2=10KΩ, $R_C$=4.7 KΩ, $R_E$=1 KΩ, What is the value of collector current at saturation if $V_{CC}$=10V?
a) 1A
b) 10mA
c) 0.87mA
d) 1ma

Ans: b

19) Determine the resonant frequency of the circuit.




a) 12 9 . kHz
b) 12.9 MHz
c) 2.05 MHz
d) 2.05 kHz

Ans: c

20) What is the most efficient way to calculate voltage or current in a two – port network?
a) Z parameters
b) Y parameters
c) H parameters
d) G parameters

Ans: c

21) How many types of parameters are used for two port networks?
a) 8
b) 1
c) 2
d) 6

Ans: d

22) Why are h parameters used for transistor calculations?
a) Ease of use
b) Ease of use, easy to measure
c) It is not used for transistor calculations
d) Easy to measure

Ans: b

23) For what type of signals does a transistor behaves as linear device?
a) small signals only
b) large signals only
c) both large and small signal
d) no signal

Ans: a

24) The dimensions of $h_{ie}$ parameters are _____
a) MHO
b) OHM
c) Farad
d) Ampere

Ans: b

25) How do we determine the value of the hybrid parameter h21 in a two – port network?
a) h21 = I1 / I2
b) h21 = V1 / V2
c) h21 = I2 / I1
d) h21 = V2 / V1

Ans: c

26) Give the relation between output and input voltage of an oscillator?
a) $A_v = V_i/V_o$
b) $V_i = V_o A_v$
c) $V_o = A_v/V_i$
d) $A_v = V_o/V_i$

Ans: d

27) What is the value of input voltage, if Aβ=1 and input voltage is 5V?
a) 0
b) 2
c) 5
d) 10
Ans: c

28) For practical oscillators, which law has to be obeyed?
a) Faraday law
b) Hertz law
c) Fleming law
d) Barkhausen law
Ans: d

29) Which of the following expression depicts Barkhausen criteria?
a) Aβ = 1
b) Aβ = 0
c) Aβ < 1 < Aβ
d) Aβ < 1
Ans: a

30) A circuit that can change the frequency of oscillation with an application of a dc voltage is sometimes called_____
a) a crystal oscillator
b) a voltage-controlled oscillator
c) an astable multivibrator
d) a Hartley oscillator
Ans: b

31) Which of the following improvements is (are) a result of the negative feedback in a circuit?
a) Higher input impedance
b) Better stabilized voltage gain
c) Lowered frequency response
d) Higher input impedance & Better stabilized voltage gain
Ans: d

32) Where does the Q point lie for class B amplifier?
a) Active
b) Cut off
c) Saturation
d) Between saturation and active
Ans: b

33) What is the value of the maximum efficiency of the class B amplifier?
a) 25%
b) 35%
c) 35% to 50%
d) 50% to 70%
Ans: d

34) What is cross over distortion?
a) Effect occurred during switching of transistor after every half cycle
b) Distortion occurred due to resistors
c) Distortion occurred due to Capacitors
d) Distortion occurred due to Inductors
Ans: a

35) How to avoid cross over distortion?
a) By using more resistance
b) By using more capacitance
c) By using more Inductance
d) By shifting the Q point above cut off
Ans: d

36) For the difference amplifier which of the following is true?
a) It responds to the difference between the two signals and rejects the signal that are common to both the signal
b) It responds to the signal that are common to the two inputs only
c) It has a low value of input resistance
d) The efficacy of the amplifier is measured by the degree of its differential signal to the preference of the common mode signal
Ans: a

37) If for an amplifier $v_1$ and $v_2$ are the input signals, $v_c$ and $v_d$ represent the common mode and differential signals respectively, then the expression for CMRR (Common Mode Rejection Ratio) is
a) 20 log ($|A_d| / |A_c|$)
b) -10 log $(|A_c| / |Ad|)^2$
c) 20 log $(v_2 – v_1 / 0.5(v_2 + v_1))$
d) All of the mentioned

Ans: d

38) The problem with the single operational difference amplifier is its
a) High input resistance
b) Low input resistance
c) Low output resistance
d) None of the mentioned

Ans: b

39) An emitter follower output impedance is _____
a) High
b) Low
c) Zero
d) Very High

Ans: b

40) The negative feedback circuits are of _____ types
a) One
b) Two
c) Three
d) Four

Ans: b

41) The shunt driven series fed also called _____ series
a) Voltage
b) Current
c) Both a and b
d) None of the above

Ans: a

42) Which feedback increases the gain of the amplifier?
a) Positive
b) Negative
c) Zero
d) None of the above

Ans: a

43) An oscillator converts ……..
a) A.c. power into d.c. power
b) d.c. power into a.c. power
c) mechanical power into a.c. power
d) none of the above

Ans:b

44) In an LC circuit, when the capacitor is maximum, the inductor energy is …….
a) Minimum
b) Maximum
c) Half-way between maximum and minimum
d) None of the above

Ans:a

45) In an LC oscillator, the frequency of oscillator is ……. L or C.
a) Proportional to square of
b) Directly proportional to
c) Independent of the values of
d) Inversely proportional to square root of

Ans:d

46) An oscillator employs …… feedback
   a) Positive
   b) Negative
   c) Neither positive nor negative
   d) Data insufficient

   Ans: a

47) Hartley oscillator is commonly used in ……
   a) Radio receivers
   b) Radio transmitters
   c) TV receivers
   d) None of the above

   Ans: a

48) A Wien bridge oscillator uses ……. feedback
   a) Only positive
   b) Only negative
   c) Both positive and negative
   d) None of the above

   Ans: c

49) The piezoelectric effect in a crystal is ……
   a) A voltage developed because of mechanical stress
   b) A change in resistance because of temperature
   c) A change in frequency because of temperature
   d) None of the above

   Ans: a

50) Quartz crystal is most commonly used in crystal oscillators because …….
   a) It has superior electrical properties
   b) It is easily available
   c) It is quite inexpensive
   d) None of the above

   Ans: a

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**SARANATHAN COLLEGE OF ENGINEERING**
**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**MCQ -EE6702- Protection and Switchgear**

**Year: III/ VI Sem A & B Sec**
**SEM:06,Even Semester** **REGULATION**: 2017
**PROGRAM**: EEE

**1. What is the purpose of back up protection?**

**a.** To increase the speed
**b.** To increase the reach
**c.** To leave no blind spot
**d.** To guard against failure of primary

**2) $SF_6$ is which type of gas?**

**a.** Electro positive
**b.** Electro negative
**c.** Both (a) and (b)
**d.** None of these

**3) For a high speed circuit breaker what will the total clearing time?**

**a.** Few minutes.
**b.** Few seconds.
**c.** 1 to 2 cycles.
**d.** 5 to 20 cycles.

**4) In a circuit breaker the contact space is ionised by what?**

**a.** Field emission from the contact surface.
**b.** Thermal emission from the contact surface.
**c.** Thermal ionisation of gas.
**d.** All of above.

**5) Which of the following should have low value for the contacts and their material?**

**a.** Thermal capacity.
**b.** Contact resistance.
**c.** Thermal conductivity.
**d.** None of above.

**6) How is the initiation of electric arc at the instant of contact separation caused?**

**a.** Thermionic emission of electrons.
**b.** Field emission of electrons.
**c.** Both (a) and (b)
**d.** None of these.

**7) The arc resistance depends on which among the following factors?**

**a.** Cross section of the arc.
**b.** Length of the arc.
**c.** Degree of ionization
**d.** All of the above.

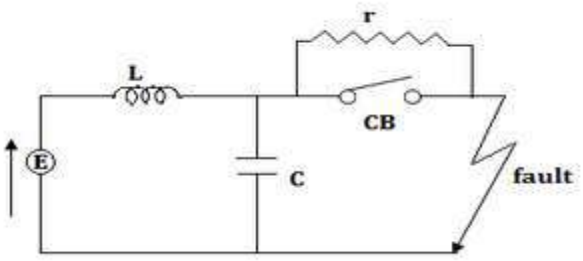
**8) What is the advantage of HRC fuses over Rewirable fuses?**

**a.** High speed operation
**b.** High rupturing capacity
**c.** No ageing effect.
**d.** All of the above.

**9) A fuse wire of circular cross section has a radius of 0.8mm. The wire blows off at a curre the radius of the wire that will blow off at a current of 1A?**

**a.** 0.2 mm
**b.** 0.18 mm
**c.** 0.28 mm
**d.** 0.3 mm

**10) In the following figure, which component ensures the safety of the line from damage?**




**a.** Relay
**b.** Circuit breaker
**c.** Bus bar
**d.** Current transformer

**1) Which of the following circuit breakers is used for the railway electrification?**

**a. Air blast circuit breaker**
**b. SF6 circuit breaker**
**c. Bulk oil circuit breaker**
**d. Minimum oil circuit breaker**

**12) The stability of arc in vacuum depends on _____.**

**a. The contact material only.**
**b. The circuit parameters only.**
**c. The contact materials and its vapour pressure.**
**d. Both (b) and (c)**
**e. None of these**

**13) What is the average rate of rise of restriking voltage upto the first peak?**

**a. 525 * 103kV / sec**
**b. 453 * 103kV / sec**
**c. 582 * 103 kV / sec**
**d. 467 * 103 kV / sec**

**14) Circuit breakers usually operate under**

**a. Steady short circuit current**
**b. Sub transient state of short circuit current**
**c. Transient state of short circuit current**
**d. None of these**

**15) What is the actuating quantity for the relays?**

**a. Magnitude**
**b. Frequency**
**c. Phase angle**
**d. All of these**

**16) Which among these are the main characteristics of a fuse element?**

**a. Low melting point**
**b. High conductivity**
**c. Least deterioration due to oxidation**
**d. All of the above**

**17) What is the making capacity of the circuit breaker?**

**a. Less than the asymmetrical breaking capacity of the breaker**
**b. Greater than the asymmetrical breaking capacity of the breaker**
**c. Equal to the asymmetrical breaking capacity of the breaker**
**d. Equal to the symmetrical breaking capacity of the breaker**

**18) A three phase, 33 kV oil circuit breaker is rated 1200 A, 2000 MVA, 3s. What is its symm current?**

**a. 1200 A**
**b. 3600 A**
**c. 35 kA**
**d. 104.8 kA**

**19) What should be the value of fusing factor?**

**a. Equal to zero**
**b. Equal to one**
**c. Less than one**
**d. More than one**

**20) What is the relation between the fusing current and the diameter of the wire?**

**a. I = k d3**
**b. I = k d3/2**
**c. I = k d2**
**d. I = k d2/3**

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**EE 8005 – Special Electrical Machines**

**Regulation 2017, Even Semester**

**Multiple Choice Questions**

**1. How does a Stepper Motor move?**

**A.Electrical Pulse**

B.Continuous Applied Voltage

C. Alternates from A and B

**2. A pulse can be produce by which means ?**

A. Microprocessor

B. Timing Logic

C. Toggle Switch

**D. All of the above**

3. Which of the following is not a type of stepper motor?

A. Variable Reluctance

B. Hybrid

C. Magnetic

**D. Lead-Screw**

4. What is the difference between full-step and half-step?

A. In full-step two phases are on and in half-step only one phase is on.

B. More resonance is evident in half-step

C. More power required for full-step

**D. Half-step offers better resolution**

**5.** Which of the following is NOT an advantage of stepper motors?

A. Cost-efficient

B. Maintenance-free

C. No feedback

**D. More complex circuitry**

**6.** With a stator having 8 teeth and a rotor having 6 teeth, what step angle will an application be able to achieve?

**A. 15°**

B. 51°

C. 20°

D. 105°

**7.** If an application using a stepper motor required feedback, which device would be needed to accomplish this?

A. Counter

**B. Encoder**

C. Linear Guide
D. Commutator

8. Which type of single-phase motor is relatively free from mechanical and ,agnetic vibrations?
A. Universal motor
**B. Hysteresis motor**
C. Shaded pole motor
D. Reluctance motor

9. The motor having a smooth chrome-steel cylindrical as its rotor with no rotor winding is
A. Universal motor
**B. Hysteresis motor**
C. Repulsion motor
D. Reluctance motor

10. The direction of rotation of hysteresis motor is determined by the
A. resistivity if the rotor material
B. amount of hysteresis
C. permeability of rotor material
**D. position of shaded pole w.r.t main pole**

11. The position of the shaded pole with respect to the main pole determines the
A. directon of a split-phase motor
B. direction of flow of current
**C. direction of rotation of hysteresis motor**
D. direction of rotation of squirrel cage motor.

12. Which of the following motor is preferred for tape recorder?
A.Reluctance motor
**B.Hysteresis motor**
C.Universal motor
D.Split phase motor.

13. Reluctance motors are singly-excited.
**a) True**
b) False

14. Reluctance motor can produce torque at _____
a) any speed less than synchronous speed
**b) synchronous speed only**
c) any speed greater than synchronous speed
d) all of the mentioned

15. For a reluctance motor, the maximum average torque occurs when δ = _____
**a) 45°**
b) 90°
c) 0°
d) 180°

16. The single phase reluctance machine acts as a generator when angle δ is _____
a) positive

**b) negative**
c) zero
d) any of the mentioned
17. Which of the following are applications of singly excited magnetic systems?
a) electromagnets, relays
b) moving-iron instruments
c) reluctance motors
**d) all of the mentioned**

18. SRM stands for?
A. Synchronous reluctance motor
B. Stepper reluctance motor
**C. Switched reluctance motor**
D. Simple reluctance motor

19. Synchronous reluctance motors have an equal number of stator and rotor poles

**A. TRUE**
B. FALSE
C. Can be true and false
D. Can not say

20. What is the angle between stator direct axis and quadrature axis?

A. 0
B. 45
**C. 90**
D. 180

21. The variation of reluctance Rl with space angle θr depends on the shape of _____

A. stator poles
B. rotor poles
C. stator or rotor poles
**D. both stator and rotor poles**

22. Single phase reluctance motors are extensively used in _____

A. grinder applications
**B. driving electric clocks and other timing devices**
C. welding applications
D. lifts/ elevators

23.The Hall effect sensor is used as the rotor position sensor for the BLDC motor.
**A.True**
B.False

24. In BLDC motor armature windings are placed on the stator side.
**A.True**

B.False

25. BLDC motor is analogous to_____

**A. Permanent magnet synchronous motor**

B.DC motor

C.Rotating Transformer

D.Single-phase Induction motor.

26. The speed of a BLDC motor can be controlled by _____

**A. Changing input Dc voltage**

B. Changing temperature

C. Changing wind direction

D. Cannot be controlled

27. Which are the advantages of BLDC motor?

i) Low cost

ii) Simplicity

iii) Reliability

iv) Good Performance

**A. i), ii), iii), iv)**

B. i), ii)

C. i), ii), iv)

D. ii),iii), iv)

28. Which type of field winding required in PMMDC?

a) series winding

b) shunt winding

c) cumulative winding

**d) none of the mentioned**

29. PMMDC are smaller in size due to _____

**a) absence of field winding**

b) presence of smaller field winding

c) present of magnets

d) Any of the mentioned

30. A PMMDC motor has an armature resistance of 4.2 ohms. When 6 V supply is applied to motor it runs at 1215 rpm drawing 14.5 mA on no-load. The rotational losses is?

**a) 86.1 mW**

b) 86.1 W

c) 8.6 W

d) 8.6 mW

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# SARANATHAN COLLEGE OF ENGINEERING
## TRICHY-12
## DEPARTMENT OF EEE
## HVDC Transmission – EE8010
## (Even Semester, Regulation 2017)
## MCQ Questions

1. Which of the following assumptions is true while analysing the converter circuit?
   a. Supply voltages are balanced
   b. DC load inductance is infinity
   c. Switches are assumed to be ideal
   d. All of the above

   Ans: d
2. PIV means
   a. Peak Inductor Voltage
   b. Peak Inverse Voltage
   c. Positive Inverse Voltage
   d. None of the above

   Ans: b
3. Volt-ampere rating(ie power rating) of the valve is given by
   a. PIV*Iav
   b. PIV*Irms
   c. PIV*Imax
   d. V*Iav

   Ans: a
4. Rating of the converter transformer is calculated by
   a. Vrms*Iav
   b. Vrms*Imax
   c. Vmax*Imax
   d. Vrms*Irms

   Ans: d
5. Pulse number of the converter is given by the expression
   a. P=q*s/r
   b. P=q/s*r
   c. P=q*s*r
   d. P=S*r/q

   Ans: c
6. The general expression for calculating the output voltage of the converter circuit for $\alpha=0$ is
   a. $Vdo=\{(s*q*Em)*\sin(\pi/q)\}/2\pi$

b. Vdo={(q*Em)*sin(π/q)}/2 π
c. Vdo={(s*Em/q)*sin(π/q)}/2 π
d. Vdo={(s*q*Em)*sin(π/2q)}/2 π

Ans: a

7. The general expression for calculating the Peak Inverse Voltage across a valve when q is even is given by
   a. Em
   b. Em/2
   c. 2*Em
   d. √2*Em

   Ans: c
8. The general expression for calculating the Peak Inverse Voltage across a valve when q is odd is given by
   a. 2*Em*sin(π/2*q)
   b. 2*Em*cos(π/2*q)
   c. 2*Em*sin(π/q)
   d. 2*Em*cos(π/q)

   Ans: b
9. The PIV of a valve and Vdo of the converter must be as_____ as possible and as _____ as possible respectively.
   a. high,low
   b. low,low
   c. high,high
   d. low, high

   Ans: d
10. In a Commutation group which contains 'q' number of valves, how many valves will be conducting at a time neglecting overlap?
    a. q
    b. 1
    c. q-1
    d. q-2

    Ans: b
11. For a given converter, the pulse number (p) and the ratio PIV/Vdo are desired to be
    a. high and low
    b. high
    c. low and high
    d. low

    Ans: a

12. For a given converter, Transformer Utilisation Factor(TUF) and the ratio Vdo/E are desired to be
    a. Zero, high
    b. Near Unity, high
    c. Zero, low
    d. Near Unity, low

    Ans: b
13. The harmonics on the AC side of the converter is given by the expression
    a. n*p
    b. 2*n*p
    c. n*p/2
    d. n*p±1

    Ans: d
14. The lowest order of the harmonics on the AC side of the 6-pulse and 12-pulse converter are
    a. 3and 7
    b. 5 and 7
    c. 5 and 11
    d. 7 and 13

    Ans: c
15. The general expression to compute the ratio PIV/Vdo when 'q' is even is given by
    a. 2 π/{s*q* sin(π/q)}
    b. π/{s*q* sin(π/q)}
    c. 2 π/{q* sin(π/q)}
    d. 2 π/{s*q* sin(π/2*q)}

    Ans: a
16. The general expression to compute the ratio PIV/Vdo when 'q' is odd is given by
    a. 2 π/{s*q* sin(π/q)}
    b. π/{s*q* sin(π/q)}
    c. 2 π/{q* sin(π/q)}
    d. π/{s*q* sin(π/2*q)}

    Ans: d
17. The pulse number, p and value of PIV should be high and low respectively in order to
    a. Increase harmonics and cost of the valve respectively
    b. decrease harmonics and increase cost of the valve respectively
    c. increase harmonics and decrease cost of the valve respectively
    d. decrease harmonics and cost of the valve respectively

    Ans: b
18. the general expression for Vdo/E is given by
    a. {(s*q*√2E)*sin(π/q)}/2 π

b. {(√2s*q)*sin(π/q)}/π
c. {(√2s*q)*sin(π/q)}/2π
d. {(√2s*q)*sin(π/2q)}/π

Ans:b

19. Transformer Utilisation Factor(TUF) is defined as the ratio of
    a. Transformer rating(secondary side) to DC output of the converter
    b. Transformer rating(primary side) to DC input of the converter
    c. DC input of the converter to Transformer rating(primary side)
    d. DC output of the converter to Transformer rating(secondary side)

    Ans:a
20. The expression for transformer secondary side current is given by
    a. $I_t=I_d/\sqrt{q}$
    b. $I_t=I_d/(r*q)$
    c. $I_t=I_d/(r*\sqrt{q})$
    d. $I_t=I_d/q$

    Ans: c
21. The equation for calculating TUF is given by
    a. π/{√2*√q* sin(π/q)}
    b. π/{√q* sin(π/q)}
    c. π/{√2* sin(π/q)}
    d. π/{2*q* sin(π/q)}

    Ans:a
22. The optimum value of 'q' for better TUF is given by
    a. 2
    b. 1
    c. 4
    d. 3

    Ans:d
23. For the 6 pulse Greatz circuit, the values of q,r and s are given by
    a. q=3, r=2 and s=1
    b. q=3, r=1 and s=2
    c. q=2, r=3 and s=1
    d. q=6, r=1 and s=1

    Ans: b
24. How many commutating groups are present in the Greatz converter bridge circuit?
    a. 1
    b. 3
    c. 2
    d. 4

Ans: c

25. In a Greatz converter , a pair of valves, one from each commutating group, is conducting for a period of ___ degrees neglecting overlap.
    a. 60 degrees
    b. 90 degrees
    c. 30 degrees
    d. 45 degrees

    Ans: a
26. In a Greatz converter, how many valves will be conducting at a time if overlap is neglected?
    a. 1
    b. 3
    c. 2
    d. 4

    Ans: c
27. In a Geatz converter, which of the following assumptions holds true for the current to transfer from one valve to the another valve instantaneously?
    a. Voltages are assumed to be balanced
    b. Source inductances are assumed to be zero
    c. DC load inductance is assumed to be infinity
    d. Valves are assumed to be ideal ones

    Ans: b
28. In a Greatz bridge converter, each valve is fired once for every ___ degrees irrespective of the mode of operation.
    a. 30
    b. 90
    c. 180
    d. 60

    Ans: d
29. Due to the presence of source _____ of the supply, the current from one valve cannot transfer to the next valve instantaneously.
    a. Inductance
    b. Resistance
    c. Capacitance
    d. None of the above

    Ans: a
30. If the overlap angle ‘u’ of valves of the converter is equal to zero, then number of valves conducting at a time is
    a. 3
    b. 1

c. 2
d. 4

Ans: c

31. If the overlap angle ‘u’ is in the range 0<u,60, then number of valves conducting at a time is
    a. 2 0r 3
    b. 1 or 2
    c. 2 or 4
    d. 1 or 3

    Ans: a
32. If the overlap angle ‘u’ for valves of the converter is equal to 60 degree, then number of valves conducting at a time is
    a. 2
    b. 1
    c. 3
    d. 4

    Ans: 3
33. If the overlap angle ‘u’ of valves of the converter is greater than 60 degree, then number of valves conducting at a time is
    a. 2 or 3
    b. 1 or 3
    c. 2 or 4
    d. 3 or 4

    Ans:d
34. When a gate pulse is applied to a valve, it will start conducting only if its commutation voltage is
    a. Negative
    b. Positive
    c. Zero
    d. Greater than supply voltage

    Ans: b

33. The expression for average DC output voltage of the converter is ___ if the firing angle is α degrees neglecting overlap.

a. $Vd=(3\sqrt{3} * Em*\cos \alpha)/ \pi$

b. $Vd=(3 * Em*\cos \alpha)/ \pi$

c. $Vd=(\sqrt{3} * Em*\cos \alpha)/ \pi$

d. $Vd=(3\sqrt{3} * Em*\cos \alpha)/ 2\pi$

Ans: a

35. The input voltage supplied to the Greatz converter is 230kV and the firing angle of the valves are 60 degrees. Source inductance is assumed to be zero. The output voltage of the converter is given by
    a. 170.2 KV
    b. 155.3 KV
    c. 164.6 KV
    d. 159.2 KV

    Ans: b
36. The average DC output voltage of the converter _____ due to overlap of the conduction of the valves.
    a. Increases
    b. Decreases
    c. Remains the same
    d. Distorts

    Ans: b
37. The three phase bridge converter acts as rectifier when the firing angle value is
    a. $\alpha > 90$
    b. $\alpha < 90$
    c. $90 < \alpha < 180$
    d. $0 < \alpha < 90$

    Ans: d
38. The three phase bridge converter acts as rectifier when the firing angle value is
    a. $\alpha > 90$
    b. $\alpha < 90$
    c. $90 < \alpha < 180$
    d. $0 < \alpha < 90$

    Ans: c
39. Power transmitted from the rectifier end through the DC transmission line depends on
    a. Rectifier output current
    b. Rectifier output voltage
    c. Firing angle
    d. Both rectifier output voltage and current

    Ans: d
40. In order to change the power transmitted in the DC line, current is _____ and voltage is _____.
    a. Constant & varied
    b. Varied & constant

c. Varied & varied
d. Constant & reversed

Ans: a

41. In order to reverse the direction of the power transmitted in the DC line, current is _____ and voltage is _____.
    a. Constant & varied
    b. Varied & constant
    c. Varied & varied
    d. Constant & reversed

    Ans: d
42. The relation between the firing angle and power factor of the converter , neglecting overlap, is given by
    a. cosΦ=2*cos α
    b. cosΦ=cos α
    c. cosΦ=cos2 α
    d. cosΦ=1/cos α

    Ans: b
43. As the firing angle α of the converter increases, then the _____ of the converter _____.
    a. Active power & remains the same
    b. Reactive power & decreases
    c. Active power & increases
    d. reactive power & increases

    Ans: d
44. when the bridge converter is delivering rated active power to the DC transmission line, the reactive power consumed by the converter is ___ of the active power transmitted.
    a. 30 to 40 %
    b. 20 to 30 %
    c. 50 to 60 %
    d. 80 to 90 %

    Ans: c
45. In order to prevent the voltage sag on the AC bus of the power system due to excessive, reactive power consumption of the converter, which of the following is incorporated to the converter side to deliver the reactive power locally to the converter?
    a. Static capacitor
    b. SVS
    c. Filters
    d. All of the above

    Ans: d
46. The average output voltage of the converter Vd is zero when the firing angle α is

a. Zero
b. 90 degrees
c. 60 degrees
d. 120 degrees

Ans: b

47. The delay angle α is not allowed to go below a minimum level for rectifier operation and beyond 180-ϒ for inverter operation where ϒ is the extinction angle in order to ensure the
    a. Smooth firing of all the valves
    b. Elimination of harmonics
    c. Power reversal
    d. None of the above

    Ans: a
48. Typical value of the extinction angle ϒ for the inverter operation is
    a. 5 to 10 degrees
    b. 0 to 5 degrees
    c. 15 to 20 degrees
    d. 30 to 40 degrees

    Ans: c
49. Commutation resistance of the converter is given by
    a. 3*w*L/ π
    b. w*L/ π
    c. π*w*L/3
    d. 3*w*L

    Ans: a
50. The effect of commutation resistance of the converter is that
    a. It increases the output voltage of the converter
    b. It does not affect the output voltage of the converter
    c. It decreases the output voltage of the converter
    d. None of the above

    Ans: c

51. In which of the following mode is the HVDC system operated?
    a. Constant voltage mode
    b. Constant current mode
    c. Constant power mode
    d. None of the above

    Ans. B
52. The increase of power in the HVDC link can be achieved by _____ and yet improving power factor.

a. Increasing α
b. Increasing β
c. Decreasing α
d. Increasing ϒ

Ans. C

53. To avoid commutation failure, it is economical to operate the inverter in ____ control.
    a. Constant Extinction Angle (CEA)
    b. Constant current
    c. Constant β
    d. None of the above

    Ans.a

54. The main problem in CEA control which makes operation unstable is
    a. Negative resistance characteristics
    b. Positive resistance characteristics
    c. Flat resistance characteristics
    d. None of the above

    Ans.a

55. Under normal condition, the rectifier operates at _____ control and the inverter operates at _____ control.
    a. CEA and CC
    b. CC and CC
    c. CEA and CEA
    d. CC and CEA

    Ans. D

56. Voltage or current controllers are always used instead of power control because
    a. The damping factor in DC line is small
    b. Circuit becomes complex and looses flexibility
    c. Strong communication is required
    d. All of the above

    Ans. D

57. The DC link current will increase when the rectifier voltage ___ and inverter voltage _____.
    a. Decreases and increases
    b. Increases and decreses
    c. Increases and increases
    d. Decreases and decreases

    Ans. B

58. When the DC link current increases, which of the following should not be done?
    a. Increasing α
    b. Increasing β

c. Decreasing α
d. Increasing ϒ

Ans.c

59. Tap setting in the converter transformer can be used when
    a. α reaches $\alpha_{min}$
    b. power factor become due to large α
    c. power factor become due to small β
    d. all of the above

    ans. D

60. The main advantage of using power electronics control compared to tap setting control of the transformer is
    a. Power electronics control is quite fast
    b. Power electronics control is easy
    c. Power electronics control consumes less power
    d. None of the above

    Ans. A

61. The signal that is sent from system control to master control is
    a. Current order reference
    b. Power order reference
    c. Voltage order reference
    d. None of the above

    Ans.b

62. T he signal that is sent from master control to valve group control is
    a. Current order reference
    b. Power order reference
    c. Voltage order reference
    d. None of the above

    Ans. A

63. VDCOL refers to
    a. Voltage independent current limit
    b. Voltage dependent current order level
    c. Voltage dependent current order limit
    d. None of the above

    Ans.c

64. The advantage of Independent Phase Control(IPC) is that
    a. It results in uncharacteristic harmonics
    b. It causes harmonic instability
    c. It requires more filters
    d. It gives higher DC output voltage

Ans. D

65. The main disadvantage of the Equidistant Pulse Control (EPC) is that
    a. It does not require synchronisation of control pulses
    b. It results in higher negative damping
    c. It produces low DC output voltage
    d. None of the above

    Ans.c

**SARANATHAN COLLEGE OF ENGINEERING**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**
**MCQ TYPE QUESTIONS**
**EE8251 CIRCUIT THEORY**
**Regulation: 2017, Even Semester**

# Year/Sem: I/ II

**1. A pure capacitor connected across an A.C. voltage consumed 50 W. This is due to**

- (A) The capacitive reactance in ohms
- (B) The current flowing in capacitor
- (C) The size of the capacitor being quite big
- (D) The statement is incorrect

**2. The period of a wave is**

- (A) The same as frequency
- (B) Time required to complete one cycle
- (C) Expressed in amperes
- (D) None of the above

**3. The r.m.s. value and mean value is the same in the case of**

- (A) Triangular wave
- (B) Sine wave
- (C) Square wave
- (D) Half wave rectified sine wave

**4. Poor power factor**

- (A) Reduces load handling capability of electrical system
- (B) Results in more power losses in the electrical system
- (C) Overloads alternators, transformers and distribution lines
- (D) Results in all above

**5. Power factor of the system is kept high**

- (A) To reduce line losses
- (B) To maximize the utilization of the capacities of generators, lines and transformers
- (C) To reduce voltage regulation of the line
- (D) Due to all above reasons

**6. Inductance of coil**

- (A) Is unaffected by the supply frequency
- (B) Decreases with the increase in supply frequency
- (C) Increases with the increase in supply frequency
- (D) Becomes zero with the increase in supply frequency

**7. Which of the following coil will have large resonant frequency?**

- (A) A coil with large resistance
- (B) A coil with low resistance
- (C) A coil with large distributed capacitance
- (D) A coil with low distributed capacitance

**8. At very low frequencies a series R-C circuit behaves as almost purely**

- (A) Resistive
- (B) Inductive
- (C) Capacitive
- (D) None of the above

**9. The phosphors for which of the following pair are 180° out of phase for VL, VC and VR?**

- (A) VC and VR
- (B) VL and VR
- (C) VC and VL
- (D) None of the above

**10. The period of a sine wave is _____ seconds. Its frequency is**

- (A) 20 Hz
- (B) 30 Hz
- (C) 40 Hz
- (D) 50 Hz

**11. The power is measured in terms of decibels in case of**

- (A) Electronic equipment
- (B) Transformers
- (C) Current transformers
- (D) Auto transformers

**12. Wire-wound resistors are unsuitable for use at high frequencies because they**

- (A) Create more electrical noise
- (B) Are likely to melt under excessive eddy current heat

- (C) Consume more power
- (D) Exhibit unwanted inductive and capacitive effects

**13. The product of apparent power and cosine of the phase angle between circuit voltage and current is**

- (A) True power
- (B) Reactive power
- (C) Volt-amperes
- (D) Instantaneous power

**14. In a series resonant circuit, the impedance of the circuit is**

- (A) Minimum
- (B) Maximum
- (C) Zero
- (D) None of the above

**15. In series resonant circuit, increasing inductance to its twice value and reducing capacitance to its half value**

- (A) Will change the maximum value of current at resonance
- (B) Will change the resonance frequency
- (C) Will change the impedance at resonance frequency
- (D) Will increase the selectivity of the circuit

**16. In a loss-free R-L-C circuit the transient current is**

- (A) Oscillating
- (B) Square wave
- (C) Sinusoidal
- (D) Non-oscillating

**17. In a circuit containing R, L and C, power loss can take place in**

- (A) C only
- (B) L only
- (C) R only
- (D) All above

**18. Time constant of a capacitive circuit**

- (A) Increases with the decrease of capacitance and decrease of resistance
- (B) Increases with the decrease of capacitance and increase of resistance
- (C) Increases with the increase of capacitance and decrease of resistance
- (D) Increase with increase of capacitance and increase of resistance

**19. The effective resistance of an iron-cored choke working on ordinary supply frequency is more than its true resistance because of**

- (A) Iron loss in core
- (B) Skin effect
- (C) Increase in temperature
- (D) Capacitive effect between adjacent coil turns

**20. Skin effect occurs when a conductor carries current at _____ frequencies.**

- (A) Very low
- (B) Low
- (C) Medium
- (D) High

**21. Which of the following refers to a parallel circuit?**

- (A) The current through each element is same
- (B) The voltage across element is in proportion to it's resistance value
- (C) The equivalent resistance is greater than any one of the resistors
- (D) The current through any one element is less than the source current

**22. The frequency of domestic power supply in India is**

- (A) 200 Hz
- (B) 100 Hz
- (C) 60 Hz
- (D) 50 Hz

**23. The frequency of an alternating current is**

- (A) The speed with which the alternator runs
- (B) The number of cycles generated in one minute
- (C) The number of waves passing through a point in one second
- (D) The number of electrons passing through a point in one second

**24. In a pure inductive circuit if the supply frequency is reduced to 1/2, the current will**

- (A) Be reduced by half
- (B) Be doubled
- (C) Be four times as high
- (D) Be reduced to one fourth

**25. A sine wave has a frequency of 50 Hz. Its angular frequency is _____ radian/second.**

- (A) 100 n
- (B) 50 jt
- (C) 25 JT
- (D) 5 n

**26. Two waves of the same frequency have opposite phase when the phase angle between them is**

- (A) 360°
- (B) 180°
- (C) 90°
- (D) 0°

**27. In a pure inductive circuit**

- (A) The current is in phase with the voltage
- (B) The current lags behind the voltage by 90°
- (C) The current leads the voltage by 90°
- (D) The current can lead or lag by 90°

**28. The time constant of a series R-C circuit is given by**

- (A) R/C
- (B) $RC^2$
- (C) RC
- (D) $R^2C$

**29. A heater is rated as 230 V, 10 kW, A.C. The value 230 V refers to**

- (A) Average voltage
- (B) r.m.s. voltage
- (C) Peak voltage
- (D) None of the above

**30. Apaporis**

- (A) A line which represents the magnitude and phase of an alternating quantity
- (B) A line representing the magnitude and direction of an alternating quantity
- (C) A colored tag or band for distinction between different phases of a 3-phase supply
- (D) An instrument used for measuring phases of an unbalanced 3-phase load

**SARANATHAN COLLEGE OF ENGINEERING, TRICHY - 12**

Department of Electrical and Electronics Engineering

Third Semester - EEE

**EE8301 - Electrical Machines - I**

Multiple Choice Questions

1. Which of the following is the major consideration to evolve a good design?
    (a) Cost
    (b) Durability
    (c) Compliance with performance criteria as laid down in specifications
    (d) All of the above

Ans: d

2. Impose limitation on design.
    (a) Saturation
    (b) Temperature rise
    (c) Efficiency
    (d) Power factor
    (e) All above

Ans: e

3. The efficiency of a machine should be as_____ as possible to reduce the operating cost.
    (a) high
    (b) low
    (c) either of the above
    (d) none of the above

Ans: a

4. If an insulating material is operated beyond the maximum allowable temperature, its life is
    (a) drastically increased
    (b) drastically reduced
    (c) unaffected
    (d) none of the above

Ans: b

5. The design of mechanical parts is particularly important in case of_____ speed machines.
    (a) low
    (b) medium
    (c) high
    (d) any of the above

Ans: c

6. In induction motors, the length of air gap in kept as small as mechanically possible is order to have
    (a) low power factor
    (b) high power factor
    (c) high over load capacity
    (d) any of the above

Ans: b

7. In_____machines, the size of the shaft is decided by the critical speed which depends on the deflection of the shaft.

(a) small
(b) medium
(c) large
(d) any of the above.

Ans: c

8. The length cf air gap to be provided in_____is primarily determined by power factor consideration.

(a) d.c. series motor .
(b) d.c. shunt motor
(c) induction motor
(d) synchronous motor

Ans: c

9. Electrical machines having a power output up to about 750 W may be called_____machines.

(a) small size
(b) medium size
(c) large size
(d) any of the above

Ans: a

10. Electrical machines having power outputs ranging from a few kW up to approximately 250 kW may be classified as

(a) small size machines
(b) medium size machines
(c) large size machines
(d) any of the above

Ans: b

11. Commercial available medium size machines have a speed range of_____.

(a) 200 to 400 r.p.m.
(b) 600 to 1000 r.p.m.
(c) 1000 to 1500 r.p.m.
(d) 2000 to 2500 r.p.m.

Ans: d

12. The action of electromagnetic machines can be related to which of the following basic principles ?

(a) Induction
(b) Interaction
(c) Alignment
(d) All of the above

Ans: d

13. The change in flux linkages can be caused in which of the following ways ?

(a) The flux is constant with respect to time and is stationary and the coil moves through it
(b) The coil is stationary with respect to flux and the flux varies in magnitude with respect to time
(c) Both the changes mentioned above occur together, i.e., the coil moves through a time varying field
(d) All of the above

Ans: d

14. _____is universally used for windings of electrical machines because it is easily workable without any possibility of fracture.

(a) Silver
(b) Steel
(c) Aluminium
(d) Copper

Ans: d

15. Aluminium when adopted as a conductor material in_____transformers, decreases the overall cost of the transformer

(a) small size
(b) medium size
(c) large size
(d) any of the above size

Ans: a

16. Which of the following materials is used in the manufacture of resistance grids to be used in the starters of large motors?

(a) Copper
(b) Aluminium
(c) Steel
(d) Cast-iron

Ans: d

17. Materials exhibiting zero value of resistivity are known as_____.

(a) conductors
(b) semiconductors
(c) insulators
(d) superconductors

Ans: d

18. _____has a lowrelative permeability and is used principally in field frames when cost is of primary importance and extra weight is not objectionable.

(a) Cast steel
(b) Aluminium
(c) Soft steel
(d) Cast iron

Ans: d

19. _____is extensively used for those portions of magnetic circuit which carry steady flux and need superior mechanical properties ?

(a) Grey cast-iron
(b) Cast steel
(c) High carbon steel
(d) Stainless steel

Ans: b

20. Hot rolled sheets have_____value of permeability

(a) zero
(b) low
(c) high
(d) none of the above

Ans: b

21. The heated parts of an electrical machine dissipate heat into their surroundings by which of the following modes of heat dissipation ?
(a) Conduction
(b) Convection
(c) Radiation
(d) All of the above
Ans: d

22. The heat dissipated by from a surface depends upon its temperature and its characteristics like colour, roughness etc.
(a) conduction
(b) convection
(c) radiation
(d) any of the above
Ans: c

23. The mcrease in heat dissipation by air blasts is due to increase in
(a) conduction
(b) convection
(c) radiation
(d) any ofthe above
Ans: b

24. On which of the following variables heat convected depends ?
(a) Power density
(b) Temperature difference between heated surface and coolant
(c) Thermal resistivity, density, specific heat
(d) Gravitational constant
(e) All of the above
Ans: e

25. Which of the following methods is used for air cooling of turbo-alternators ?
(a) One sided axial ventilation
(b) Two sided axial ventilation
(c) Multiple inlet system
(d) All of the above
Ans: d

26. Multiple inlet system of air cooling of turbo-alternators can be used for machines of rating upto
(a) 10 MW
(b) 30 MW
(c) 60 MW
(d) 150 MW
Ans: c

27. Which of the following is an advantage of hydrogen cooling ?
(a) Increase in efficiency
(b) Increase in ratings
(c) Increase in life
(d) Smaller size of coolers
(e) All of the above

Ans: e

28. The density of hydrogen is_____times the density of air.
(a) 0.07
(b) 1.5
(c) 2.5
(d) 3.5
Ans: a

29. Hydrogen has a heat transfer co-efficient_____times that of air
(a) 1.5
(b) 2.5
(c) 3.5
(d) 4.5
Ans: a

30. The thermal conductivity of hydrogen is_____times that of air
(a) 2
(b) 3
(c) 5
(d) 7
Ans: d

31. With conventional hydrogen cooling it is possible to increase the rating of a single unit to
(a) 50 MW
(b) 100 MW
(c) 200 MW
(d) none of the above
Ans: c

32. The noise produced by a_____cooled machine is less as the rotor moves in a medium of smaller density.
(a) air
(b) hydrogen
(c) either (a) or (b)
(d) none of the above
Ans: b

33. cooling is the process of dissipating the armature and field winding losses to a cooling medium circulating within the winding insulation wall
(a) Direct
(b) Indirect
(c) Conventional
(d) Any of the above
Ans: a

34. Machines cooled by direct cooling method may be called
(a) “supercharged”
(b) “inner cooled”
(c) “conductor cooled”
(d) any of the above
Ans: d

35. In direct cooled system using hydrogen both stator and rotor conductors are made
(a) solid
(b) hollow
(c) perforated
(d) any of the above
Ans: b

36. With direct water cooling it is possible to have ratings of about
(a) 200 MW
(b) 300 MW
(c) 400 MW
(d) 600 MW
Ans: d

37. The resistivity of water should not be less than
(a) 10 Q m
(b) 100 Q m
(c) 1000 Q m
(d) 2000 Q m
Ans: d

38. Direct water cooling of rotor winding presents
(a) no mechanical difficulties
(b) lesser mechanical difficulties
(c) greater mechanical difficulties
(d) none of the above
Ans: c

39. The time taken by the machine to attain 0.632 of its final steady temperature rise is called
(a) heating time constant
(b) cooling time constant
(c) either (a) or (b)
(d) none of the above
Ans: a

40. In self cooled motors the cooling time constant is about_____than the heating time constant because cooling conditions are worse at standstill.
(a) 2 to 3 times greater
(b) 3 to 4 times greater
(c) 4 to 5 times greater
(d) none of the above
Ans: a

41. By which of the following methods motor rating for variable load drives can be determined?
(a) Method of average losses
(b) Equivalent current method
(c) Equivalent torque method
(d) Equivalent power method
(e) All of the above.
Ans: e

42. Which of the following methods does not take into account the maximum temperature rise under variable load conditions?

(a) Equivalent power method
(b) Equivalent current method
(c) Method of average losses
(d) Equivalent torque method

Ans: c

43. Which of the following methods is most accurate?
(a) Equivalent current method
(b) Equivalent power method
(c) Equivalent torque method
(d) Method of average losses

Ans: a

44. By which of the following methods the temperature rise of windings and other parts may be determined?
(a) Thermometer method
(6) Resistance method
(c) Embedded temperature detector method
(d) Any of the above

Ans: d

45. The slot leakage can be calculated by making which of the following assumptions?
(a) The current in the slot conductors is uniformly distributed over their cross-section
(b) The leakage path is straight across the slot and around the iron at the bottom
(c) The permanence of air paths is only considered. The reluctance of iron paths is assumed as zero
(d) All of the above

Ans: d

46. The value of exciting or magnetizing current depends upon which of the following factors?
(a) Total m.m.f. required
(b) The number of turns in the exciting winding
(c) The way in which the winding is distributed
(d) All of the above

Ans: d

47. Tractive magnets are operated from
(a) a.c. supply
(b) d.c. supply
(c) either a.c. or d.c. supply
(d) none of the above

Ans: c

48. electromagnets generally function as holding magnets.
(a) Tractive
(b) Portative
(c) Either of the above
(d) None of the above

Ans: b

49. Which of the following is the commonly used type of electromagnets?
(a) Flat-faced armature type
(b) Horse shoe type

(c) Flat-faced plunger type
(d) All of the above

Ans: d

50. _____are used for construction of core of electromagnets.
(a) Soft magnetic materials
(b) Hard magnetic materials
(c) Either (a) or (b)
(d) None of the above

Ans: a

51. The design of electromagnets is based upon which of the following fundamental equations?
(a) Force equation
(b) Magnetic circuit equation
(c) Heating equation
(d) Voltage equation
(e) All of the above

Ans: e

52. When the two coil sides forming a coil are spaced exactly one pole pitch apart they are said to be of
(a) short pitch
(b) full pitch
(c) either of the above
(d) none of the above

Ans: b

53. _____are always double layer type.
(a) Closed windings
(b) Open windings
(c) Either of the above
(d) None of the above

Ans: a

54. The distance between the starts of two consecutive coils measured in terms of coil sides is called
(a) front pitch
(b) winding pitch
(c) commutator pitch
(d) back pitch

Ans: b

55. The winding where dummy coils are used is sometimes called
(a) duplex winding
(b) triplex winding
(c) forced winding
(d) none of the above

Ans: c

56. Dummy coil should not be used in
(a) small machines
(b) large machines
(c) either (a) or (b)
(d) none of the above

Ans: b

57. Power transformers have rating
(a) equal to 50 kVA
(6) equal to 100 kVA
(c) above 200 kVA
(d) none of the above
Ans: c

58. Power transformers should be designed to have maximum efficiency
(a) at one-fourth load
(b) at one-half load
(c) at or near full load
(d) any of the above
Ans: c

59. In transformers using hot rolled steel, the cross-section of the yoke is made about_____greater than that of the core
(a) 5 percent
(b) 10 percent
(c) 15 percent
(d) 30 percent
(e) none of the above
Ans: c

60. Yokes with rectangular cross-section are used for
(a) small capacity transformers
(b) medium capacity transformers
(c) large capacity transformers
(d) any of the above
Ans: a

61. The cold rolled grain-oriented steel has_____permeability in the direction of the grain orientation.
(a) minimum
(b) maximum
(c) nil
(d) none of the above
Ans: b

62. Cylindrical windings using circular conductors, employed in transformers, are
(a) single layered
(b) double layered
(c) multi-layered
(d) none of the above
Ans: c

63. Helical windings are used in
(a) distribution transformers
(b) power transformers
(c) shell type transformers
(d) none of the above
Ans: b

64. Multi-layer helical windings are commonly used in the transformers as high voltage windings

(a) upto 20 kV
(b) upto 50 kV
(c) upto 80 kV
(d) for 110 kV and above

Ans: d

65. Disc windings are primarily used in
(a) short capacity transformers
(b) medium capacity transformers
(c) high capacity transformers
(d) any of the above

Ans: c

66. The heat dissipating capability of transformers of ratings higher than 30 kVA in increased by providing which of the following?
(a) Corrugations
(b) Fins
(c) Tubes
(d) Radiator tanks
(e) All of the above

Ans: e

67. Transformers with a capacity of up to_____have a cooling radiator system with natural cooling
(a) 2 MVA
(b) 5 MVA
(c) 7.5 MVA
(d) 10 MVA

Ans: d

68. The forced oil and air circulation method is usual one for transformers of capacities
(a) upto 5 MVA
(b) upto 10 MVA
(c) upto 20 MVA
(d) 30 MVA upwards

Ans: d

69. The flash point of transformer oil should be higher than
(a) 40°C
(b) 60°C
(c) 80°C
(d) 104°C

Ans: d

70. The voltage control in electric supply networks in required on account of which of the following reasons ?
(a) Adjustment of voltage at consumers premises within statutory limits
(b) Control of active and reactive power
(c) Adjustment of short period daily and seasonal voltage variations in accordance with variations of load
(d) All of the above

Ans: d

71. D.C. windings are

(a) sometimes 2-layer type
(b) never 2-layer type
(c) always 2-layer type
(d) none of the above

Ans: c

72. The usual values of maximum flux densities for distribution transformers using hot rolled silicon steel are

(a) 0.5 to 0.8 $Wb/m^2$
(b) 0.8 to 1.0 $Wb/m^2$
(c) 1.1 to 1.35 $Wb/m^2$
(d) 1.4 to 1.8 $Wb/m^2$

Ans: c

73. For 275 kV transformers, using cold rolled grain-oriented steel, which of the following values of flux density may be used?

(a) 1.0 $Wb/m^2$
(b) 1.1 $Wb/m^2$
(c) 1.3 $Wb/m^2$
(d) 1.6 $Wb/m^2$
(e) None of the above

Ans: d

74. For large power transformers, self oil-cooled type or air blast type which of the following values of current density may be used ?

(a) 1.0 to 1.2 $A/mm^2$
(b) 1.5 to 2.0 $A/mm^2$
(c) 2.2 to 3.2 $A/mm^2$
(d) 3.2 to 4.2 $A/mm^2$

Ans: c

75. A current density of_____is used for large power transformers with forced circulation of oil or with water cooling coils

(a) 1.5 to 2.5 $A/mm^2$
(b) 3.5 to 4.5 $A/mm^2$
(c) 4.0 to 5.0 $A/mm^2$
(d) 5.4 to 6.2 $A/mm^2$

Ans: d

76. The high voltage winding is usually which of the following type?

(a) Cylindrical winding with circular conductors
(b) Cross-over winding with either circular or small rectangular conductors
(c) Continuous disc type winding with rectangular conductors
(d) All of the above types

Ans: d

77. Which of the following is the basic consideration in the design of insulation?

(a) Electrical considerations
(b) Mechanical considerations
(c) Thermal considerations
(d) All of the above

Ans: d

78. A practical formula for determining the thickness of insulation between low voltage and high voltage windings is

(a) 1 + 0.2 kVmm
(6) 2 + 0.5 kVmm
(c) 4 + 0.7 kV mm
(d) 5 + 0.9 kV mm

Ans: d

79. The insulation between windings and grounded core and the insulation between the windings of the same phase is called

(a) minor insulation
(b) major insulation
(c) either of the above
(d) none of the above

Ans: b

80. The cylindrical windings using circular conductors are used for current rating of

(a) upto 20 A
(b) upto 40 A
(c) upto 60 A
(d) upto 80 A

Ans: d

81. The surge phenomenon is particularly important in case of

(a) low voltage transformers
(b) medium voltage transformers
(c) high voltage transformers
(d) any of the above

Ans: c

82. Which of the following in an application of D.C. motors?

(a) Traction
(b) Drives for process industry
(c) Battery driven vehicles
(d) Automatic control
(e) All of the above

Ans: e

83. The stator of a D.C. machine comprises of

(a) main poles
(b) interpoles
(c) frame
(d) all of the above

Ans: d

84. The laminations of the armature of a D.C. machine are usually_____thick.

(a) 0.1 to 0.2 mm
(b) 0.2 to 0.3 mm
(c) 0.3 to 0.4 mm
(d) 0.4 to 0.5 mm

Ans: d

85. _____is usually used for brush rockers

(a) Mild steel
(b) Copper
(c) Aluminium
(d) Cast-iron

Ans: d

86. _____brushes are fragile and cause excessive wear of commutator.
(a) Natural graphite
(b) Hard carbon
(c) Electro graphitic
(d) Metal graphite

Ans: a

87. Which of the following brushes can be used for high values of current density?
(a) Metal graphite brushes
(b) Hard carbon brushes
(c) Electro-graphitic brushes
(d) Natural graphite brushes

Ans: a

88. _____is the common method of applying brushes to the commntator.
(a) Radial
(b) Trailing
(c) Reaction
(d) All of the above

Ans: d

89. Which of the following problem arises in D.C. motors which are fed from thyristor bridge circuits ?
(a) Increased $I^2R$ losses
(b) Increased core losses
(c) Poor commutation
(d) Change in motor parameters
(e) All of the above

Ans: e

90. The weight of copper of both armature and field windings decreases with_____in number of poles.
(a) increase
(b) decrease
(c) either of the above
(d) none of the above

Ans: a

91. In a D.C. machine the number of brush arms is_____the number of poles.
(a) less than
(b) equal to
(c) greater than
(d) none of the above

Ans: b

92. In a D.C. machine the current per brush arm should not be more than
(a) 100 A
(6) 200 A
(e) 300 A

(d) 400 A

Ans: d

93. In a D.C. machine, the value of peripheral speed should not, normally, exceed

(a) 10 m/s
(b) 20 m/s
(c) 30 m/s
(d) 40 m/s

Ans: c

94. In D.C. machines the width of the duct is usually

(a) 4 mm
(b) 6 mm
(c) 8 mm
(d) 10 mm

Ans: d

95. D.C. machines designed with a large value of air gap length have

(a) worst, ventilation
(b) poor ventilation
(c) better ventilation
(d) none of the above

Ans: c

96. In D.C. machines, ir order to prevent excessive distortion of field form by the armature reaction, the field mmf must be made

(a) equal to that of armature mmf
(b) less in comparison with the armature mmf
(c) large in comparison with the armature mmf
(d) none of the above

Ans: c

97. In D.C. machines, the_____in field mmf results in increase in size and cost of machines.

(a) increase
(b) decrease
(c) either of the above
(d) none of the above

Ans: a

98. The operation of a D.C. machine with large air gap lengths is comparatively

(a) quiet
(b) noisy
(c) either of the above
(d) none of the above

Ans: a

99. Which of the following methods may be adopted to reduce the effects of armature reaction?

(a) Increase in length of air gap at pole tips
(b) Increasing reluctance of pole tips
(c) Compensating windings
(d) Interpoles
(e) All of the above

Ans: e

100. In D.C. machines the usual limit of slot pitch is
(a) between 5 to 10 mm
(b) between 10 to 15 mm
(c) between 15 to 20 mm
(d) between 25 to 35 mm

Ans: d

**SARANATHAN COLLEGE OF ENGINEERING**
**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**EE 8351 – Digital Logic Circuits**
**Odd Semester, Regulation 2017**
**Multiple Choice questions**

**Q.1** The NAND gate output will be low if the two inputsare

**(A)**00 **(B)**01
**(C)**10 **(D)**11

**Ans: D**

The NAND gate output will be low if the two inputs are 11
(The Truth Table of NAND gate is shown in Table.1.1)

| X(Input) | Y(Input) | F(Output) |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

Table 1.1 Truth Table for NAND Gate

**Q.2** Whatisthebinaryequivalentofthedecimalnumber368

**(A)**101110000 **(B)**110110000
**(C)**111010000 **(D)**111100000

**Ans: A**

The Binary equivalent of the Decimal number 368 is 101110000
(Conversion from Decimal number to Binary number is given in Table 1.2)

| | |
|---|---|
| 2 | 368 |
| 2 | 184 --- 0 |
| 2 | 92 ---0 |
| 2 | 46 ---0 |
| 2 | 23 ---0 |
| 2 | 11 ---1 |
| 2 | 5 ---1 |
| 2 | 2 ---1 |
| 2 | 1 ---0 |
| | 0 --- 1 |

Table 1.2 Conversion from Decimal number to Binary number

**Q.3** The decimal equivalent of hex number 1A53is

**(A)**6793 **(B)**6739

**(C)**6973 **(D)**6379

**Ans: B**

The decimal equivalent of Hex Number 1A53 is 6739

(Conversion from Hex Number to Decimal Number is given below)

| 1 | A | 5 | 3 | Hexadecimal |
|---|---|---|---|---|
| $16^3$ | $16^2$ | $16^1$ | $16^\circ$ | Weights |

$(1A53)_{16} = (1X16^3) + (10 X 16^2) + (5 X 16^1) + (3 X 16^o)$

$=4096 + 2560 + 80 + 3$

$= 6739$

**Q.4** $(734)_8 = ()_{16}$

**(A)** C 1 D **(B)** D C1

**(C)** 1C D **(D)** 1 DC

**Ans: D**

$(734)_8 = (1\ DC)_{16}$

0001 | 1101 | 1100

1 D C

**Q.5** Thesimplificationofthe Booleanexpression $\left(ABC\right)+\left(ABC\right)$ is

**(A)**0 **(B)**1

**(C)**A **(D)**BC

**Ans: B**

The Boolean expression is $\left(ABC\right)+A\left(BC\right)$ is equivalent to 1

$\left(ABC\right)+\left(ABC\right)=A+B+C\overline{A}+B+\overline{C}=A+B+\overline{C}+A+B+\overline{C}$

$= (A+\overline{A})(B+\overline{B})(C+\overline{C}) = 1X1X1 = 1$

**Q.6** The number of control lines for a 8 – to – 1 multiplexeris

**(A)**2 **(B)**3

**(C)**4 **(D)**5

**Ans: B**

The number of control lines for an 8 to 1 Multiplexer is 3

(The control signals are used to steer any one of the 8 inputs to the output)

**Q.7** How many Flip-Flops are required for mod–16counter?

**(A)**5 **(B)**6

**(C)**3 **(D)**4

**Ans: D**

The number of flip-flops is required for Mod-16 Counter is 4.

(For Mod-m Counter, we need N flip-flops where N is chosen to be the smallest number for which 2N is greater than or equal to m. In this case 24 greater than or equal to 1)

**Q.8** EPROM contents can be erased by exposing itto

**(A)** Ultravioletrays. **(B)** Infraredrays.

**(C)** Burstofmicrowaves. **(D)** Intense heatradiations.

**Ans: A**

EPROM contents can be erased by exposing it to Ultraviolet rays

(The Ultraviolet light passes through a window in the IC package to the EPROM chip where it releases stored charges. Thus the stored contents areerased).

**Q.9** Thehexadecimalnumber'A0'hasthedecimalvalueequivalentto

**(A)** 80 **(B)**256

**(C)** 100 **(D)**160

**Ans: D**

Thehexadecimalnumber'A0'hasthedecimalvalueequivalentto160 ( A

0

$16^1$ $16^0$ = 10X$16^1$ + 0X$16^0$ = 160)

**Q.10** The Gray code for decimal number 6 is equivalentto

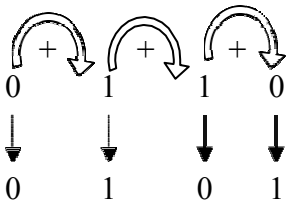
**(A)**1100 **(B)**1001

**(C)**0101 **(D)**0110

**Ans: C**

The Gray code for decimal number 6 is equivalent to 0101

(Decimal number 6 is equivalent to binary number 0110)




**Q.11** The Boolean expression $\overline{A}$.B + A.$\overline{B}$ + A.B is equivalentto

**(A)** A +B **(B)**$\overline{A}$.B

**(C)** $\overline{A+B}$ **(D)**A.B

**Ans:A**

The Boolean expression $\overline{A}$ .B + A. $\overline{B}$ + A.B is equivalent to A + B

( $\overline{A}$ .B + A. $\overline{B}$ + A.B = B( $\overline{A}$ + A ) + A. $\overline{B}$

= B + A. $\overline{B}$ { ( $\overline{A}$ + A ) = 1}

= A + B { (B + A. $\overline{B}$ ) = B + A}

**Q.12** The digital logic family which has minimum power dissipationis

**(A)** TTL **(B)**RTL
**(C)**DTL **(D)**CMOS

**Ans:D**

The digital logic family which has minimum power dissipation is CMOS.
(CMOS being an unipolar logic family, occupy a very small fraction of silicon Chip area)

**Q.13** Theoutputofalogic gateis1whenallitsinputsareatlogic0.thegateiseither
**(A)** a NAND oranEX-OR **(B)** an OR or anEX-NOR
**(C)** an AND oranEX-OR **(D)** a NOR or anEX-NOR

**Ans:D**

The output of a logic gate is 1 when all inputs are at logic 0. The gate is either a NOR or an EX-NOR .

(The truth tables for NOR and EX-NOR Gates are shown in fig.1(a) & 1(b).)

| Input | | Output |
|---|---|---|
| **A** | **B** | **Y** |
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |

Fig.1(a) Truth Table for NOR Gate

| Input | | Output |
|---|---|---|
| **A** | **B** | **Y** |
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

Fig.1(b) Truth Table for EX-NOR Gate

**Q.14** Data can be changed from special code to temporal codebyusing
**(A)** Shiftregisters **(B)**counters
**(C)**Combinationalcircuits **(D)** A/Dconverters.

**Ans:A**

DatacanbechangedfromspecialcodetotemporalcodebyusingShiftRegisters. (A Register in which data gets shifted towards left or right when clock pulses are applied is known as a ShiftRegister.)

**Q.15** AringcounterconsistingoffiveFlip-Flopswillhave
**(A)** 5states **(B)** 10states
**(C)**32states **(D)** Infinitestates.

**Ans:A**

A ring counter consisting of Five Flip-Flops will have 5 states.

**Q.16** The speed of conversion is maximumin
**(A)** Successive-approximation A/Dconverter.
**(B)** Parallel-comparative A/Dconverter.
**(C)** Counter ramp A/Dconverter.
**(D)** Dual-slope A/Dconverter.

**Ans:B**

The speed of conversion is maximum in Parallel-comparator A/D converter
(Speed of conversion is maximum because the comparisons of the input voltage are carried out simultaneously.)

**Q.17** The 2's complement of the number 1101101is

**(A)**0101110 **(B)**0111110
**(C)**0110010 **(D)**0010011

**Ans:D**

The 2's complement of the number 1101101 is 0010011
(1's complement of the number 1101101 is 0010010
2's complement of the number 1101101is 0010010 + 1 =0010011)

**Q.18** Thecorrectiontobeappliedindecimaladdertothegeneratedsumis

**(A)**00101 **(B)**00110
**(C)**01101 **(D)**01010

**Ans:B**

The correction to be applied in decimal adder to the generated sum is 00110.
When the four bit sum is more than 9 then the sum is invalid. In such cases, add +6(i.e. 0110) to the four bit sum to skip the six invalid states. If a carry is generated when adding 6, add the carry to the next four bit group.

**Q.19** When simplified with Boolean Algebra (x + y)(x + z) simplifiesto

**(A)** x **(B)** x + x(y +z)
**(C)** x(1+yz) **(D)** x +yz

**Ans:D**

When simplified with Boolean Algebra (x + y)(x + z) simplifies to x + yz
[(x + y) (x + z)] = xx + xz + xy + yz = x + xz + xy +yz( xx =x)
= x(1+z) + xy + yz = x + xy +yz{ (1+z) =1}
= x(1 + y) + yz = x +yz{ (1+y) =1}]

**Q.20** The gates required to build a half adderare

**(A)** EX-OR gate andNORgate **(B)** EX-OR gate and ORgate
**(C)** EX-OR gate andANDgate **(D)** Four NANDgates.

**Ans:C**

The gates required to build a half adder are EX-OR gate and AND gate
Fig.1(d) shows the logic diagram of half adder.

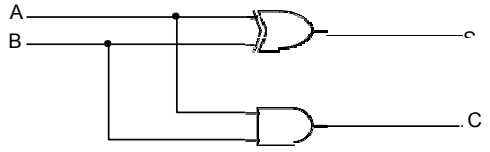



Fig.1(d) Logic diagram of Half Adder

**Q.21** Thecodewhereallsuccessivenumbersdifferfromtheirprecedingnumberbysinglebitis

**(A)** Binarycode. **(B)**BCD.

**(C)** Excess–3. **(D)**Gray.

**Ans:D**

The code where all successive numbers differ from their preceding number by single bit is Gray Code.

(It is an unweighted code. The most important characteristic of this code is that only a single bit change occurs when going from one code number to next.)

**Q.22** Which of the following is the fastestlogic

**(A)** TTL **(B)**ECL

**(C)**CMOS **(D)**LSI

**Ans:B**

ECL is the fastest logic family of all logic families.

(High speeds are possible in ECL because the transistors are used in difference amplifier configuration, in which they are never driven into saturation and thereby the storage time iseliminated.

**Q.23** If the input to T-flipflop is 100 Hz signal, the final output of the three T-flipflops in cascadeis

**(A)**1000Hz **(B)** 500Hz

**(C)**333Hz **(D)** 12.5Hz.

**Ans:D**

If the input to T-flip-flop is 100 Hz signal, the final output of the three T- flip-flops in cascade is 12.5Hz

{The final output of the three T-flip-flops in cascade is

$(T) = \frac{Frequency}{2^N} = \frac{100}{2^3} = 12.5\text{Hz}\}$

**Q.24** Which of the memory is volatilememory

**(A)** ROM **(B)**RAM

**(C)**PROM **(D)**EEPROM

**Ans:B**

RAM is a volatile memory

(Volatile memory means the contents of the RAM get erased as soon as the power goes off.)

**Q.25** -8 is equal to signed binarynumber

**(A)**10001000 **(B)**00001000

**(C)**10000000 **(D)**11000000

**Ans:A**

- 8 is equal to signed binary number 10001000

(To represent negative numbers in the binary system, Digit 0 is used for the positive sign and 1 for the negative sign. The MSB is the sign bit followed by the magnitude bits.i.e.,

- 8 = 10001000

Sign Magnitude

**Q.26** DeMorgan's first theorem shows the equivalenceof

**(A)** OR gate and Exclusive ORgate.
**(B)** NOR gate and Bubbled ANDgate.
**(C)** NOR gate and NANDgate.
**(D)** NAND gate and NOTgate

**Ans:B**

DeMorgan's first theorem shows the equivalence of NOR gate and Bubbled AND gate

(Logic diagrams for De Morgan's First Theorem is shown in fig.1(a)

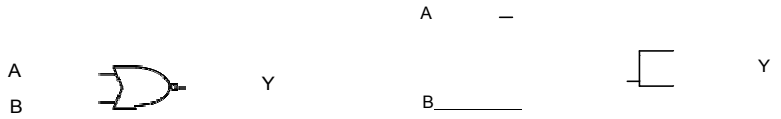



Fig.1(a) Logic Diagrams for De Morgan's First Theorem

**Q.27** The digital logic family which has the lowest propagation delaytimeis

**(A)** ECL **(B)** TTL
**(C)** CMOS **(D)** PMOS

**Ans:A**

The digital logic family which has the lowest propagation delay time is ECL

(Lowest propagation delay time is possible in ECL because the transistors are used in difference amplifier configuration, in which they are never driven into saturation and thereby the storage time is eliminated).

**Q.28** The device which changes from serial data to parallel datais

**(A)** COUNTER **(B)** MULTIPLEXER
**(C)**DEMULTIPLEXER **(D)** FLIP-FLOP

**Ans:C**

The device which changes from serial data to parallel data is demultiplexer.

(A demultiplexer takes in data from one line and directs it to any of its N outputs depending on the status of the select inputs.)

**Q.29** A device which converts BCD to Seven Segment iscalled

**(A)** Encoder **(B)** Decoder
**(C)** Multiplexer **(D)** Demultiplexer

**Ans:B**

A device which converts BCD to Seven Segment is called DECODER.
(A decoder coverts binary words into alphanumeric characters.)

**Q.30** In a JK Flip-Flop, togglemeans

**(A)** Set Q = 1 and $\overline{Q}$ =0.

**(B)** Set Q = 0 and $\overline{Q}$ =1.

**(C)** Change the output to the oppositestate.

**(D)** No change inoutput.

**Ans:C**

In a JK Flip-Flop, toggle means Change the output to the opposite state.

**Q.31** The access time of ROM using bipolar transistors isabout

**(A)** 1sec **(B)** 1msec

**(C)**1µsec **(D)** 1nsec.

**Ans:C**

The access time of ROM using bipolar transistors is about 1 $\mu$sec.

**Q.32** TheA/Dconverterwhoseconversiontimeisindependentofthenumberofbitsis

**(A)** Dualslope **(B)** Countertype

**(C)**Parallelconversion **(D)** Successiveapproximation.

**Ans:C**

The A/D converter whose conversion time is independent of the Number of bits is Parallel conversion.
(This type uses an array of comparators connected in parallel and comparators compare the input voltage at a particular ratio of the reference voltage).

**Q.33** When signed numbers are used in binary arithmetic, then which one of the following notations would have unique representation forzero.

**(A)** Sign-magnitude. **(B)** 1'scomplement.

**(C)** 2'scomplement. **(D)** 9'scomplement.

**Ans: A**

**Q.34** The logic circuit given below (Fig.1) converts a binarycode $y_1y_2$ $y_3$into

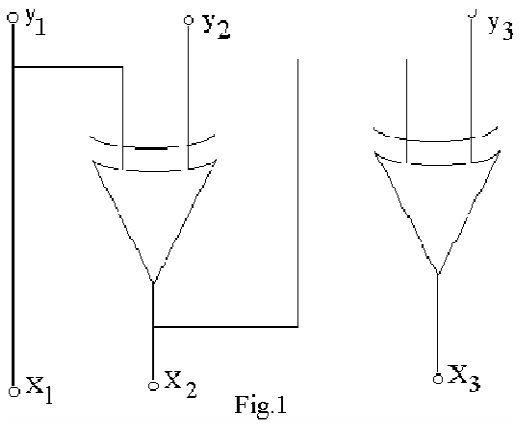



Fig.1

**(A)** Excess-3code. **(B)** Graycode.
**(C)** BCD code. **(D)** Hamming code.

**Ans: B**

Gray code as

X1=Y1, X2=Y1 XOR Y2 , X3=Y1 XOR Y2 XORY3

| For | Y1 | Y2 | Y3 | X1 | X2 | X3 |
|---|---|---|---|---|---|---|
| | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 1 | 0 | 0 | 1 |
| | 0 | 1 | 0 | 0 | 1 | 1 |
| | 0 | 1 | 1 | 0 | 1 | 0 |

**Q.35** The logic circuit shown in the given fig.2 can be minimisedto

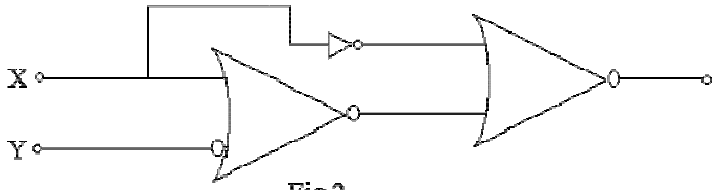
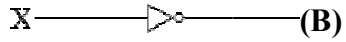
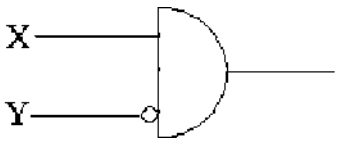
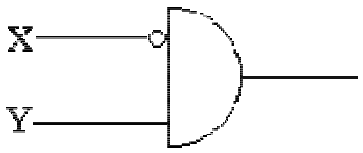



Fig.2

**(A)** 

**(B)** 


**(C)** 

**(D)**


**Ans: D**

As output of the logic circuit is
Y=(X+Y')'+(X'+(X+Y')')'
(X+Y')'=X'Y Using DE Morgan's
Now this is one of input of 2nd gate. F=(A+X')'=A'X=[(X'Y)'.X]
=[(X+Y')X]=X+XY'=X(Y')
=X

**Q.36** IndigitalICs,Schottkytransistorsarepreferredovernormaltransistorsbecauseoftheir

**(A)** LowerPropagationdelay. **(B)** Higher Propagationdelay.
**(C)** LowerPowerdissipation. **(D)** Higher Powerdissipation.

**Ans: A**

Lower propagation delay as shottky transistors reduce the storage time delay by preventing the transistor from going deep into saturation.

**Q.37** ThefollowingswitchingfunctionsaretobeimplementedusingaDecoder:

$f_1=\sum m(1, 2, 4, 8, 10, 14)\ f_2=\sum m(2, 5, 9, 11)\ f_3=\sum m(2, 4, 5, 6, 7)$

The minimum configuration of the decoder should be

**(A)** 2 – to –4line. **(B)** 3 – to – 8line.
**(C)** 4 – to –16line. **(D)** 5 – to – 32line.

**Ans: C**

4 to 16 line decoder as the minterms are ranging from 1 to 14.

**Q.38** A 4-bit synchronous counter uses flip-flops with propagation delay times of 15 ns each. The maximum possible time required for change of state willbe

**(A)**15ns. **(B)** 30ns.
**(C)**45ns. **(D)** 60ns.

**Ans: A**

15 ns because in synchronous counter all the flip-flops change state at the same time.

**Q.39** Words having 8-bits are to be stored into computer memory. The number of lines requiredfor writing into memoryare

**(A)**1. **(B)**2.
**(C)**4. **(D)**8.

**Ans: D**

Because 8-bit words required 8 bit data lines.

**Q.40** In successive-approximation A/D converter, offset voltage equalto $\frac{1}{2}$LSB is added to the D/A converter's output. This is doneto

**(A)** Improve the speed ofoperation.
**(B)** Reduce the maximum quantizationerror.
**(C)** Increase the number of bits at theoutput.
**(D)** Increasetherangeofinputvoltagethat canbeconverted.

**Ans: B**

**Q.41** The decimal equivalent of Binary number 11010is

**(A)**26. **(B)**36.
**(C)** 16. **(D)**23.

**Ans: A**

$11010 = 1 \text{ X } 2^4 + 1 \text{ X } 2^3 + 0 \text{ X } 2^2 + 1 \text{ X } 2^1 = 26$

**Q.42** 1'scomplementrepresentationofdecimalnumberof-17byusing8bitrepresentationis

**(A)**11101110 **(B)** 11011101
**(C)**11001100 **(D)** 00010001

**Ans: A**

$(17)_{10} = (10001)_2$
In 8 bit = 00010001
1's Complement = 11101110

**Q.43** The excess 3 code of decimal number 26is

**(A)**01001001 **(B)**01011001
**(C)**10001001 **(D)**01001101

**Ans: B**

$(26)_{10}$ in BCD is ( 00100110 ) BCD
Add 011 to each BCD 01011001 for excess – 3

**Q.44** How many AND gates are required to realize Y =CD+EF+G

**(A)**4 **(B)**5
**(C)**3 **(D)**2

**Ans: D**

To realize Y = CD + EF + G
Two AND gates are required (for CD & EF).

**Q.45** How many select lines will a 16 to 1 multiplexer willhave

**(A)**4 **(B)**3
**(C)**5 **(D)**1

**Ans: A**

In 16 to 1 MUX four select lines will be required to select 16 ( $2^4$ ) inputs.

**Q.46** How many flip flops are required to construct a decadecounter

**(A)**10 **(B)**3
**(C)**4 **(D)**2

**Ans: C**

Decade counter counts 10 states from 0 to 9 ( i.e. from 0000 to 1001 )
Thus four FlipFlop's are required.

**Q.47** Which TTL logic gate is used for wiredANDing

**(A)** Opencollectoroutput **(B)** TotemPole
**(C)** Tristateoutput **(D)** ECLgates

**Ans: A**

Open collector output.

**Q.48** CMOS circuits consumepower

**(A)** Equalto TTL **(B)** Less thanTTL
**(C)** TwiceofTTL **(D)** Thrice ofTTL

**Ans: B**

As in CMOS one device is ON & one is Always OFF so power consumption is low.

**Q.49** In a RAM, information can bestored

**(A)** By the user, number oftimes.

**(B)** By the user, onlyonce.
**(C)** By the manufacturer, a number oftimes.
**(D)** By the manufacturer onlyonce.

**Ans: A**

RAM is used by the user, number of times.

**Q.50** The hexadecimal number for $(95.5)_{10}$ is

**(A)** $(5F.8)_{16}$ **(B)** $(9A.B)_{16}$
**(C)** $(2E.F)_{16}$ **(D)** $(5A.4)_{16}$

**Ans: A**

$(95.5)_{10} = (5F.8)_{16}$

Integerpart

| | | |
|---|---|---|
| 16 | 95 | |
| 16 | 5 | 15 ↑ |
| | 0 | 5 |

Fractionalpart
0.5x16=8.0

**Q.51** The octal equivalent of $(247)_{10}$is

**(A)** $(252)_8$ **(B)** $(350)_8$
**(C)** $(367)_8$ **(D)** $(400)_8$

**Ans: C**

$(247)_{10} = (367)_8$

| | | |
|---|---|---|
| 8 | 247 | |
| 8 | 30 | ↑ 7 |
| 8 | 3 | 6 |
| | 0 | 3 |

**Q.52** Thechiefreasonwhydigitalcomputersusecomplementedsubtractionisthatit
**(A)** Simplifies thecircuitry.
**(B)** Is a very simpleprocess.
**(C)** Can handle negative numberseasily.
**(D)** Avoids directsubtraction.

**Ans: C**

Using complement method negative numbers can also be subtracted.

**Q.53** In a positive logic system, logic state 1 correspondsto
**(A)** positivevoltage **(B)** higher voltagelevel
**(C)** zerovoltagelevel **(D)** lower voltagelevel

**Ans: B**

We decide two voltages levels for positive digital logic. Higher voltage represents logic 1 & a lower voltage represents logic 0.

**Q.54** Thecommerciallyavailable8-inputmultiplexerintegratedcircuitintheTTLfamilyis
**(A)**7495. **(B)**74153.
**(C)**74154. **(D)**74151.

**Ans: B**
MUX integrated circuit in TTL is 74153.

**Q.55** CMOScircuitsareextensivelyusedforON-chipcomputersmainlybecauseoftheirextremely
**(A)** lowpowerdissipation. **(B)** high noiseimmunity.
**(C)** largepackingdensity. **(D)** lowcost.

**Ans: C**
Because CMOS circuits have large packing density.

**Q.56** The MSI chip 7474is
**(A)** Dual edge triggered JK flip-flop(TTL).
**(B)** Dual edge triggered D flip-flop(CMOS).
**(C)** Dual edge triggered D flip-flop(TTL).
**(D)** Dual edge triggered JK flip-flop(CMOS).

**Ans: C**
MSI chip 7474 dual edge triggered D Flip-Flop.

**Q.57** Which of the following memories stores the most number ofbits
**(A)** a 5M×8memory. **(B)** a 1M × 16memory.
**(C)** a 5M ×4memory. **(D)** a 1M ×12memory.

**Ans: A**
5Mx8 = 5 x 220 x 8 = 40M (max)

**Q.58** The process of entering data into a ROM iscalled
**(A)** burning intheROM **(B)** programming theROM
**(C)** changingtheROM **(D)** charging theROM

**Ans: B**
The process of entering data into ROM is known as programming the ROM.

**Q.59** Whenthesetofinputdatatoanevenparitygeneratoris0111,theoutputwillbe
**(A)**1 **(B)**0
**(C)**Unpredictable **(D)** Depends on the previousinput

**Ans: B**
In even parity generator if number of 1 is odd then output will be zero.

**Q.60** The number 140 in octal is equivalentto

**(A)** $(96)_{10}$. **(B)** $(86)_{10}$.

**(C)** $(90)_{10}$. **(D)** none ofthese.

**Ans: A**

$(140)_8 = (96)_{10}$

$1 \times 8^2 + 4 \times 8 + 0 \times 1 = 64 + 32 = 96$

**Q.61** The NOR gate output will be low if the two inputsare

**(A)**00 **(B)**01

**(C)**10 **(D)**11

**Ans: B, C, or D**

O/P is low if any of the I/P is high

**Q.62** Which of the following is the fastestlogic?

**(A)** ECL **(B)**TTL

**(C)**CMOS **(D)**LSI

**Ans: A**

**Q.63** How manyflip-flops are required to construct mod 30counter

**(A)**5 **(B)**6

**(C)**4 **(D)**8

**Ans: A**

Mod - 30 counter +/- needs 5 Flip-Flop as $30 < 2^5$

Mod - N counter counts total ' N ' number of states.

To count 'N' distinguished states we need minimum n FlipFlop's as [$N = 2^n$]

For eg. Mod 8 counter requires 3 Flip-Flop's ($8 = 2^3$)

**Q.64** How many address bits are required to represent a 32 Kmemory

**(A)** 10bits. **(B)** 12bits.

**(C)**14bits. **(D)** 16bits.

**Ans: D**

$32K = 2^5 \times 2^{10} = 2^{15}$,

Thus 15 address bits are required, Only 16 bits can address it.

**Q.65** The number of control lines for 16 to 1multiplexeris

**(A)**2. **(B)**4.

**(C)**3. **(D)**5.

**Ans: B**

As $16 = 2^4$, 4 Select lines are required.

**Q.66** Which of following requiresrefreshing?

**(A)** SRAM. **(B)**DRAM.

**(C)**ROM. **(D)**EPROM.

**Ans: B**

**Q.67** Shiftingaregistercontenttoleftbyonebitpositionisequivalentto
**(A)** divisionbytwo. **(B)** addition bytwo.
**(C)** multiplicationbytwo. **(D)** subtraction bytwo.

**Ans:C**

**Q.68** ForJKflipflopwithJ=1,K=0,theoutputafterclockpulsewillbe
**(A)**0. **(B)**1.
**(C)**highimpedance. **(D)** nochange.

**Ans: B**

**Q.69** Convert decimal 153 to octal. Equivalent in octal willbe
**(A)** $(231)_8$. **(B)**$(331)_8$.
**(C)** $(431)_8$. **(D)** none ofthese.

**Ans: A**
$(153)_{10} = (231)_8$

| | | |
|---|---|---|
| 8 | 153 | 1 |
| 8 | 19 | 3 |
| 8 | 2 | 2 |

**Q.70** The decimal equivalent of $(1100)_2$is
**(A)**12 **(B)**16
**(C)**18 **(D)**20

**Ans: A**
$(1100)_2 = (12)_{10}$

**Q.71** The binary equivalent of $(FA)_{16}$is
**(A)**10101111 **(B)** 11111010
**(C)**10110011 **(D)** none ofthese

**Ans: B**
$(FA)_{16} = (11111010)_{10}$

**Q.72** The output of SR flip flop when S=1, R=0is
**(A)**1 **(B)**0
**(C)**Nochange **(D)** Highimpedance

**Ans: A**

As for the SR flip-flop S=set input R=reset input ,when S=1, R=0, Flip-flop will be set.

**Q.73** The number of flip flops contained in IC 7490is

**(A)**2. **(B)**3.
**(C)**4. **(D)**10.

**Ans: A**

**Q.74** The number of control lines for 32 to 1multiplexeris

**(A)**4. **(B)**5.
**(C)**16. **(D)**6.

**Ans: B**

The number of control lines for 32 ($2^5$) and to select one input among them total 5 select lines are required.

**Q.75** HowmanytwO-inputANDandORgatesarerequiredtorealizeY=CD+EF+G

**(A)**2,2. **(B)**2,3.
**(C)**3,3. **(D)** none ofthese.

**Ans: A**

Y=CD+EF+G
Number of two input AND gates=2
Number of two input OR gates = 2
One OR gate to OR CD and EF and next to OR of G & output of first OR gate.

**Q.76** Which of following can not be accessedrandomly

**(A)** DRAM. **(B)**SRAM.
**(C)**ROM. **(D)** Magnetictape.

**Ans: D**

Magnetic tape can only be accessed sequentially.

**Q.77** The excess-3 code of decimal 7 is representedby

**(A)**1100. **(B)**1001.
**(C)**1011. **(D)**1010.

**Ans: D**

An excess 3 code is always equal to the binary code +3

**Q.78** WhenaninputsignalA=11001isappliedtoaNOTgateserially,itsoutputsignalis

**(A)**00111. **(B)**00110.
**(C)**10101. **(D)**11001.

**Ans: B**

As A=11001 is serially applied to a NOT gate, first input applied will be LSB 00110.

**Q.79** The result of adding hexadecimal number A6 to 3Ais

**(A)** DD. **(B)**E0.
**(C)**F0. **(D)**EF.

**Ans: B**

**Q.80** A universal logic gate is one, which can be used to generate any logic function. Which of the following is a universal logicgate?

**(A)** OR **(B)**AND
**(C)**XOR **(D)**NAND

**Ans: D**

NAND can generate any logic function.

**Q.81** The logic 0 level of a CMOS logic device isapproximately

**(A)** 1.2volts **(B)** 0.4volts
**(C)**5volts **(D)** 0volts

**Ans: D**

CMOS logic low level is 0 volts approx.

**Q.82** Karnaugh map is used for the purposeof

**(A)** Reducing the electronic circuitsused.
**(B)** To map the given Boolean logicfunction.
**(C)** To minimize the terms in a Booleanexpression.
**(D)** To maximize the terms of a given a Booleanexpression.

**Ans: C**

**Q.83** A full adder logic circuit willhave

**(A)** Two inputs and oneoutput.
**(B)** Three inputs and threeoutputs.
**(C)** Two inputs and twooutputs.
**(D)** Three inputs and twooutputs.

**Ans: D**

A full adder circuit will add two bits and it will also accounts the carry input generated in the previous stage. Thus three inputs and two outputs (Sum and Carry) are there.

**Q.84** An eight stage ripple counter uses a flip-flop with propagation delay of 75 nanoseconds. The pulse width of the strobe is 50ns. The frequency of the input signal which can be used for proper operation of the counter isapproximately

**(A)** 1MHz. **(B)** 500MHz.
**(C)**2MHz. **(D)** 4MHz.

**Ans: A**

Maximum time taken for all flip-flops to stabilize is 75ns x 8 + 50 = 650ns. Frequency of operation must be less than 1/650ns = 1.5 MHz.

**Q.85** The output of a JK flipflop with asynchronous preset and clear inputs is '1'. The output can be changed to '0' with one of the followingconditions.

**(A)** By applying J = 0, K = 0 and using aclock.
**(B)** By applying J = 1, K = 0 and using theclock.
**(C)** By applying J = 1, K = 1 and using theclock.
**(D)** By applying a synchronous presetinput.

**Ans: C**

Preset state of JK Flip-Flop =1
With J=1 K=1 and the clock next state will be complement of the present state.

**Q.86** The information in ROM isstored

**(A)** By the user any number oftimes.
**(B)** By the manufacturer during fabrication of thedevice.
**(C)** By the user using ultravioletlight.
**(D)** By the user once and onlyonce.

**Ans: B**

**Q.87** The conversation speed of an analog to digital converter is maximum with thefollowing technique.

**(A)** Dual slope ADconverter.
**(B)** Serial comparator ADconverter.
**(C)** Successive approximation ADconverter.
**(D)** Parallel comparator ADconverter.

**Ans: D**

**Q.88** AweightedresistordigitaltoanalogconverterusingNbitsrequiresatotal of

**(A)** Nprecisionresistors. **(B)** 2N precisionresistors.
**(C)** N + 1precisionresistors. **(D)** N – 1 precisionresistors.

**Ans: A**

**Q.89** The 2's complement of the number 1101110is

**(A)**0010001. **(B)**0010001.
**(C)**0010010. **(D)**None.

**Ans: C**

1's complement of 1101110 is = 0010001
Thus 2's complement of 1101110 is = 0010001 + 1 = 0010010

**Q.90** The decimal equivalent of Binary number 10101is

**(A)**21 **(B)**31
**(C)**26 **(D)**28

**Ans: A**

$1x2^4 + 0x2^3 + 1x2^2 + 0x2^1 + 1x2^0$
$= 16 + 0 + 4 + 0 + 1 = 21.$

**Q.91** HowmanytwoinputANDgatesandtwoinputORgatesarerequiredtorealize Y =BD+CE+AB

**(A)**1, 1 **(B)** 4,2
**(C)**3, 2 **(D)** 2,3

**Ans: A**

There are three product terms, so three AND gates of two inputs are required.
As only two input OR gates are available, so two OR gates are required to get the logical sum of three product terms.

**Q.92** How many select lines will a 32:1 multiplexerwillhave

**(A)**5. **(B)**8.
**(C)**9. **(D)**11.

**Ans: A**

For 32 inputs, 5 select lines will be required, as $2^5 = 32$.

**Q.93** How many address bits are required to represent 4Kmemory

**(A)** 5bits. **(B)** 12bits.
**(C)**8bits. **(D)** 10bits.

**Ans: B**

Forrepresenting4Kmemory,12addressbitsarerequiredas 4K
$= 2^2 \times 2^{10} = 2^{12}$ $(1K = 1024 = 2^{10})$

**Q.94** For JK flipflop J = 0, K=1, the output after clock pulsewillbe

**(A)** 1. **(B)** nochange.
**(C)**0. **(D)** highimpedance.

**Ans: C**

J=0, K=1, these inputs will reset the flip-flop after the clock pulse. So whatever be the previous output, the next state will be 0.

**Q.95** Which of following are known as universalgates

**(A)** NAND &NOR. **(B)** AND &OR.
**(C)** XOR&OR. **(D)**None.

**Ans: A**

NAND & NOR are known as universal gates, because any digital circuit can be realized completely by using either of these two gates.

**Q.96** Whichofthefollowingmemoriesstoresthemostnumberofbits

**(A)** 64K×8memory. **(B)** 1M ×8 memory.

**(C)** 32M ×8memory. **(D)** 64 × 6memory.

**Ans: C**

32M x 8 stores most number of bits

$2^5 \times 2^{20}=2^{25}$ $(1M = 2^{20} = 1K \times 1K = 2^{10} \times 2^{10})$

**Q.97** Which of following consume minimumpower

**(A)** TTL. **(B)**CMOS.

**(C)**DTL. **(D)**RTL.

**Ans: B**

CMOS consumes minimum power as in CMOS one p-MOS & one n-MOS transistors are connected in complimentary mode, such that one device is ON & one is OFF.

**SARANATHAN COLLEGE OF ENGINEERING**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**
**MCQ TYPE QUESTIONS**
**EE8391 ELECTROMAGNETIC THEORY**
**Regulation: 2017, Odd Semester**

# Year/Sem: II/ III

1.Find the spherical coordinates of A(2,3,-1)
a) (3.74, $105.5^0$, $56.13^0$)
b) **(3.74, $105.5^0$, $56.31^0$)**
c) (3.74, $106.5^0$, $56.13^0$)
d) (3.74, $106.5^0$, $56.31^0$)

2.Find the Cartesian coordinates of B(4,$25^0$,$120^0$)
a) (0.845, 1.462, 3.625)
b) **(-0.845, 1.462, 3.625)**
c) (-8.45, 2.462, 6.325)
d) (8.45, 2.462, 6.325)

3.The area of sphere can be computed from the sphere volume. State True/False.
**a) True**
b) False

4.The cylindrical coordinate system is also referred to as
a) Cartesian system
b**) Circular system**
c) Spherical system
d) Space system

5.Transform the vector B=yi+(x+z)j located at point (-2,6,3) into cylindrical coordinates.
a**) (6.325,-71.57,3)**
b) (6.325,71.57,3)
c) (6.325,73.57,3)
d) (6.325,-73.57,3)

6.Cylindrical system is employed in waveguides. State True/False.
a) **True**
b) False

7.The best definition of polarisation is
a) Orientation of dipoles in random direction

b**) Electric dipole moment per unit volume**
c) Orientation of dipole moments
d) Change in polarity of every dipole

8.Polarizability is defined as the
a) Product of dipole moment and electric field
b) **Ratio of dipole moment to electric field**
c) Ratio of electric field to dipole moment
d) Product of dielectric constant and dipole moment

9.The total polarisation of a material is the
a) Product of all types of polarisation
b**) Sum of all types of polarisation**
c) Orientation directions of the dipoles
d) Total dipole moments in the material

10.Which component of the electric field intensity is always continuous at the boundary?
a) **Tangential**
b) Normal
c) Horizontal
d) Vertical

11.Find the magnetic force when a charge 3.5C with flux density of 4 units is having a velocity of 2m/s.
a) 14
b**) 28**
c) 7
d) 32

12.Find the electric field when the velocity of the field is 12m/s and the flux density is 8.75 units.
a) 510
**b) 105**
c) 150
d) 165

13.When currents are moving in the same direction in two conductors, then the force will be
a) **Attractive**
b) Repulsive
c) Retracting
d) Opposing

14.The magnetic force impacts the energy of the field. State True/false.
a) **True**
b) False

15.The first Maxwell law is based on which law?
a) Ampere law
b) Faraday law
c) Lenz law
d) **Faraday and Lenz law**

16.The benefit of Maxwell equation is that
a) **Any parameter can be calculated**
b) Antenna can be designed
c) Polarisation of the wave can be calculated
d) Transmission line constants can be found

17.The curl of the electric field intensity is
a) Conservative
**b) Rotational**
c) Divergent
d) Static

18.Which of the following identities is always zero for static fields?
a) Grad(Curl V)
b) Curl(Div V)
c) Div(Grad V)
d**) Curl(Grad V)**

19. Electric field intensity due to infinite sheet of charge σ is
a) Zero
b) Unity
c) σ/ε
**d) σ/2ε**

20**.**For a test charge placed at infinity, the electric field will be
a) Unity
b) +∞
**c) Zero**
d) -∞

21.In electromagnetic waves, the electric field will be perpendicular to which of the following?
a) Magnetic field intensity
b) Wave propagation

c**) Both H and wave direction**
d) It propagates independently

22.Which of the following parameters does not exist in the transmission line equation?
a) **R**
b) Zo
c) ZL
d) Propagation constant

23.The purpose of the transmission line equation is to
a) Find primary parameters
b) Find secondary parameters
c) Find the reflection cofficient
d) **Impedance matching**

24. The real part of the propagation constant is the
a) **Attenuation constant**
b) Phase constant
c) Permittivity
d) Permeability

25.The waveguides are used in a transmission line for
a) **Increasing transmission coefficient**
b) Increasing reflection coefficient
c) Decreasing transmission coefficient
d) Decreasing reflection coefficient

26.Copper behaves as a
a) **Conductor always**
b) Conductor or dielectric depending on the applied electric field strength
c) Conductor or dielectric depending on the frequency
d) Conductor or dielectric depending on the electric current density

27.For an electromagnetic wave incident from one medium to a second medium, total internal reflection takes place when
a) Angle of incidence is equal to the Brewster angle with E field perpendicular to the plane of incidence
b) Angle of incidence is equal to the Brewster angle with E field parallel to the plane of incidence
c) **Angle of incidence is equal to the critical angle with the wave moving from the denser to rarer medium**
d) Angle of incidence is equal to the critical angle with the wave moving from the rarer to denser medium

28.Find the torque in a conductor having current 2A, flux density 50 units, length 15cm and distance of 8m.
**a) 120**
b) 240
c) 800
d) 350

29.The torque of a conductor is defined only in the case when
a) The field is perpendicular to the loop
b**) The plane of the loop is parallel to the field**
c) The plane of the loop is perpendicular to the current direction
d) The field and the current direction are same

30.In free space, the charge carriers will be
a) **0**
b) 1
c) 100
d) Infinity

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**
**EE8402 – TRANSMISSION AND DISTRIBUTION**

## Regulation 2017, Even Semester

### OBJECTIVE TYPE QUESTIONS

1. Which of the following is not the transmission voltage in India?
(A) 66 kV (B) l32kV (C) 264 kV (D) 400 kV
Ans: C
2. Which of the following is usually not the generating voltage?
(A) 6.6 kV (B) 9.9 kV (C) 11kV (D) 13.2 kV.
Ans: B
3. Boosters are basically
(A) inductors (B) capacitors (C) transformers (D) synchronous motors.
Ans: C
4. Which of the following is not the distribution system normally used
(A) 3 phase-4 wire (B) 3 phase-3 wire (C) Single phase - 3 wire (D) Single phase -4 wire
Ans: D
5. Conductors for high voltage transmission lines are suspended from towers
(A) to reduce clearance from ground (B) to increase clearance from ground
(C) to reduce wind and snow loads (D) to take care of extension in length during summer.
Ans: B
6. Transmission efficiency increases as
(A) voltage and power factor both increase (B) voltage and power factor both decrease
(C) voltage increases but power factor decreases (D) voltage decreases but power factor increases.
Ans: A
7. With same maximum voltage to earth, which ac system (with p.f. 0.8) will require more copper as compared to dc 2 wire system
(A) single phase. 2 wire (mid point earthed) (B) single phase. 3 wire (neutral=1/2 outer)
(C) three phase three wire (D) three phase-four wire
Ans: D
8. When alternating current passes through a conductor
(A) it remains uniformly distributed throughout the section of conductor
(B) portion of conductor near the surface carries more current as compared to the core
(C) portion of conductor near the surface carries less current as compared to the core
(D) entire current passes through the core of the conductor.
Ans: B
9. The fact that a conductor carries more current on the surface as compared to core, is known as
(A) skin effect (B) corona (C) permeability (D) unsymmetrical fault.
Ans: A
10. The effective resistance of a conductor will be the same as ohmic resistance when
(A) current is in true sine wave form (B) voltage is low
(C) power factor is unity (D) Current is uniformly distributed in the conductor cross-section.
Ans: D
11. Skin effect results in
(A) reduced effective resistance but increased effective internal reactance of the conductor
(B) increased effective resistance but reduced effective internal reactance of. the conductor
(C) reduced effective resistance as well as effective internal reactance
(D) increased effective resistance as well as effective internal reactance.
Ans: B
12. Skin effect depends on
(A) size of the conductor (B) frequency of the current
(C) resistivity of the conductor material (D) all of the above.
Ans: D
13. The skin effect of a conductor will reduce as the
(A) diameter increases

(B) frequency increases
(C) permeability of conductor material increases

(D) resistivity of conductor material increases.
Ans: D
14. Skin effect is proportional to
(A) diameter of conductor (B) (diameter of conductor)$^{1/2}$
(C) (diameter of conductor )$^2$ (D) (diameter of conductor )$^2$.
Ans: C
15. In overhead transmission lines the effect of capacitance can be neglected when the length of line is less than
(A) 200 km (B) 160 km (C) 100 km (D) 80 km.
Ans: D
16. For constant voltage transmission the voltage drop is compensated by installing
(A) synchronous motors
(B) capacitors
(C) inductors
(D) all of the above.
Ans: A
17. The disadvantage of constant voltage transmission is
(A) short circuit current of the system is increased
(B) load power factor in heavy loads
(C) large conductor area is required for same power transmission
(D) air of the above.
Ans: A
18. The surge impedance for over head line is taken as
(A) 10-20 ohms (B) 50-60 ohms (C) 100-200 ohms (D) 1000-2000 ohms
Ans: C
19. Pin insulators are normally used up to voltage of about
(A)100kV (B) 66 kV (C) 33 kV (D) 25 kV.
Ans: D
20. Strain type insulator are used where the conductors are
(A) dead ended (B) at intermediate anchor towers
(C) any of the above (D) none of the above.
Ans: C
21. For 66 kV lines the number of insulator discs used are
(A) 3 (B) 5 (C) 8 (D) 12.
Ans: B
22. Ten discs usually suggest that the transmission line voltage is
(A) 11 kV (B) 33 kV (C) 66 kV (D) 132 kV.
Ans: D
23. The effect of corona is
(A) increased energy loss (B) increased reactance
(C) increased inductance (D) all of the above.
Ans: A
24. Corona usually occurs when the electrostatic stress in the air around the conductor succeeds
(A) 30 kV (maximum value)/cm (B) 22 kV (maximum value)/cm
(C) 11 kV (rms value)/cm (D) 6.6 kv (rms value)/cm.
Ans: A
25. Corona effect can be detected by
(A) hissing sound (B) faint luminous flow of bluish color
(C) presence of ozone detected by odor (D) all of the above.
Ans: D
26. The current drawn by the line due to corona losses is
(A) sinusoidal (B) square (C) non-sinusoidal
Ans: C
27. Presence of ozone as a result of corona is harmful because
(A) it gives bad odor (B) it corrodes the material

(C) it transfers energy to the ground (D) reduces power factor.
Ans: B
28. Between two supports, due to sag the conductor takes the form of
(A) catenary (B) triangle (C) ellipse (D) semi-circle.
Ans: A
29. The inductance of a single phase two wire line is given by (D is the distance between conductors and 2v is the diameter of conductor)
(A) 0.4 $\log_e$ (D/r) mH/km (B) 0.55 $\log_e$ (D/r) mH/km
(C) 0.4 $\log_e$ (r/D) mH/km (D) 0.55 $\log_e$ (r/D) mH/km.
Ans: A
30. The effect of ice deposition on conductor is
(A) increased skin effect (B) reduced corona losses (C) increased weight (D) reduced sag.
Ans: C
31. The effect of wind pressure is more predominant on
(A) transmission lines (B) neutral wires (C) insulator (D) supporting towers
Ans: D
32. Which of the following statement is correct ?
(A) Wind pressure reduces corona effects
(B) Ice on conductors improves power factor
(C) Wind pressure is taken to act in a direction at right angles to that for ice
(D) Wind pressure and ice on conductors together improve regulation of power transmitted.
Ans: C
33. Which of the following statements is incorrect ?
(A) As the temperature rises the tension in the transmission line decreases
(B) As temperature rises the sag in transmission lines reduces
(C) Tension and sag in transmission lines are complementary to each other.
Ans: C
34. Wooden poles for supporting transmission lines are used for voltages up to
(A) 440 V
(B)11 kV
(C) 22 kV
(D) 66 kV.
Ans: C
35. Maximum permissible span for wooden poles is
(A) 10 meter
(B) 20 meters
(C) 60 meters
(D) 200 meters.
Ans: C
36. If K is the volume of cable conductor material required to transmit power, then for the transmission of the same power, the volume of cable conductor required for single phase 2 wire AC system is
(A) 2k
(B) k $\cos\varphi$
(C) k/ $\cos^2\varphi$
(D) 2k/ $\cos^2\varphi$
Ans: D
37. When transformers or switchgears are to be installed in a transmission line, the poles used are
(A) I type
(B) J type
(C) H type
(D) L type.
Ans: C
38. For improving life, steel poles are galvanized. Galvanizing is the process of applying a layer of
(A) paint (B) varnish (C) tar coal (D) zinc.
Ans: D

39. The disadvantage of transmission lines as compared to cables is
(A) exposure to lightening
(B) exposure to atmospheric hazards like smoke, ice, etc.
(C) inductive interference between power and communication circuits
(D) all of the above.
Ans: D
40. ACSR conductor implies
(A) All conductors surface treated and realigned (B) Aluminum conductor steel reinforced
(C) Anode current sinusoidally run (D) Anodized Core Smooth Run.
Ans: B
41. The surge resistance of transmission lines is about
(A) 50 ohms (B) 100 ohms (C) 250 ohms (D) 500 ohms.
Ans: D
42. During storm the live conductor of public electric supply breaks down and touches the earth. The consequences will be
(A) supply voltage will drop (B) supply voltage will increase
(C) current will flow to earth (D) no current will flow in the conductor.
Ans: C
43. In transmission system a feeder feeds power to
(A) service mains (B) generating stations (C) distributors (D) all of the above.
Ans: C
44. For transmission lines the standing wave ratio is the ratio of
(A) maximum voltage to minimum voltage (B) maximum current to minimum voltage
(C) peak voltage to rms voltage (D) maximum reactance to minimum reactance.
Ans: A
45. In a transmission line following arc the distributed constants
(A) resistance and inductance only (B) resistance, inductance and capacitance
(C) resistance, inductance, capacitance and short conductance.
Ans: C
46. The bundling of conductors is done primarily to
(A) reduce reactance (B) increase reactance
(C) increase ratio interference (D) reduce radio interference.
Ans: A
47. Which of the following regulation is considered to be the best
(A) 2% (B) 30% (C)70% (D) 98%.
Ans: A
48. The characteristic impedance of a transmission line depends upon
(A) shape of the conductor (B) surface treatment of the conductors
(C) conductivity of the material (D) geometrical configuration. of the conductors.
Ans: D
49. For a distortion-less transmission line (G = shunt conductance between two wires)
(A) R/L = G/C (B) RL=GC (C) RG=LC (D)RLGC=0
Ans: A
50. Guard ring transmission line
(A) improves power factor (B) reduces earth capacitance of the lowest unit
(C) reduces transmission losses (D) improves regulation.
Ans: B
51. When the power is to be transmitted over a distance of 500 km, the transmission voltage should be in the range
(A) 33 kV - 66 kV (B) 66 kV - 100 kV (C) 110 kV - 150 kV (D) 150kV - 220kV.
Ans: D
52. A relay used on long transmission lines is
(A) mho's relay (B) reactance relay (C) impedance relay (D) no relay is used.
Ans: A

53. Total load transmitted through a 3 phase transmission line is 10,000 kW at 0.8 power factor lagging. The $I^2R$ losses are 900 kW. The efficiency of transmission line is
(A) 60% (B) 90% (C) 95% (D) 99%.
Ans: B
54. In order to reduce skin effect at UHF
(A) conductors are painted (B) conductors are anodized
(C) copper lubes with silver plating are used (D) copper rods with silver plating are used.
Ans: C
55. Shunt capacitance is usually neglected in the analysis of
(A) Short transmission lines (B) Medium transmission lines
(C) Long transmission lines (D) Medium as well as long transmission lines.
Ans: A
56. The chances of corona are maximum during
(A) summer heat (B) winter (C) dry weather (D) humid weather.
Ans: D
57. The power transmitted will be maximum when
(A) Sending end voltage is more (B) Receiving end voltage is more
(C) Reactance is high (D) Corona losses are least
Ans: A
58. Neglecting losses in a transmission system, if the voltage is doubled, for the same power transmission, the weight of conductor material required will be
(A) four times (B) double (C) half (D) one fourth.
Ans: D
59. When two conductors each of radius r are at a distance D, the capacitance between the two is proportional to
(A) $\log_e (D/r)$ (B) $\log_e (r/D)$ (C) $1/\log_e (D/r)$ (D) $1/\log_e (r/D)$.
Ans: C
60. In a transmission line having negligible resistance the surge impedance is
(A) $(L+C)^{1/2}$ (B) $(C/L)^{1/2}$ (C) $(1/LC)^{1/2}$ (D) $(L/C)^{1/2}$
Ans: D

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**EI8075- Fibre Optics and Laser Instrumentation**

## OBJECTIVE TYPE QUESTIONS

**Regulation: 2017, Odd Semester**

1) In an optical fiber communication system, which among the following is not a typical transmitter function?

a. Coding for error protection
b. Decoding of input data
c. Electrical to optical conversion
d. Recoding to match output standard

ANSWER: (d) Recoding to match output standard

2) Which among the following is provided by an optical receiver for the regeneration of data signal with minimum error?

a. Photo-diode
b. Signal Processing Circuits
c. Linear Circuitry
d. None of the above

ANSWER: (c) Linear Circuitry

3) For a sine wave, the frequency is represented by the cycles per _____

a. Second
b. Minute
c. Hour
d. None of the above

ANSWER: (a) Second

4) Which property/ies of PCM stream determine/s the fidelity to original analog signal?

a. Sampling rate

b. Bit depth
c. Both a and b
d. None of the above

ANSWER: (c) Both a and b

5) In single-mode fibers, how does the fraction of energy traveling through bound mode appear in the cladding?

a. As a crescent wave
b. As a gibbous wave
c. As an evanescent wave
d. All of the above

ANSWER: (c) As an evanescent wave

6) What is the typical value of refractive index for an ethyl alcohol?

a. 1
b. 1.36
c. 2.6
d. 3.4

ANSWER:(b) 1.36

7) If a light travels in a certain medium and it gets reflected off an optically denser medium with high refractive index, then it is regarded as _____

a. External Reflection
b. Internal Reflection
c. Both a and b
d. None of the above

ANSWER: (a) External Reflection

8) In an optical fiber, the concept of Numerical aperture is applicable in describing the ability of _____

a. Light Collection
b. Light Scattering
c. Light Dispersion
d. Light Polarization

ANSWER:(a) Light Collection

9) Which among the following do/does not support/s the soot formation process?

a. OVPO
b. MCVD
c. PCVD
d. All of the above

ANSWER: (c) PCVD

10) Which type of photonic crystal fiber exhibit/s its/their similarity to the periodic crystalline lattice in a semiconductor?

a. Index guiding fiber
b. Photonic bandgap fiber
c. Both a and b
d. None of the above

ANSWER: (b) Photonic bandgap fiber

11) Which type of fiber optic cable has/have its/their core with the size of about 480 µm to 980 µm & made up of polymethylmethacrylate (PMMA)?

a. Glass fiber optic cable
b. Plastic fiber optic cable
c. Plastic clad silica fiber optic cable
d. All of the above

ANSWER: (b) Plastic fiber optic cable

12) In multifiber cable system, which form of outer jacket/s consist/s of polyolefin compounds and are regarded as halogen free?

a. OFNR
b. OFNP
c. LSZH
d. All of the above

ANSWER: (c) LSZH

13) During the design of FOC system, which among the following reasons is/are responsible for an extrinsic absorption?

a. Atomic defects in the composition of glass
b. Impurity atoms in glass material
c. Basic constituent atoms of fiber material

d. All of the above

ANSWER: (b) Impurity atoms in glass material

14) Which among the following represent/s the measure/s to minimize the inhomogenities for Mie scattering reduction?

a. Extrusion Control
b. Increase in relative R.I. difference
c. Removal of imperfections due to glass manufacturing process
d. All of the above

ANSWER: (d) All of the above

15) In Kerr effect, induced index change has its proportionality with respect to _____

a. square of electric field
b. cube of electric field
c. cube root of electric field
d. one-fourth power of electric field

ANSWER: (a) square of electric field

16) Which among the following is regarded as an inelastic scattering of a photon?

a. Kerr Effect
b. Raman Effect
c. Hall Effect
d. Miller Effect

ANSWER: (b) Raman Effect

17) Which kind/s of misalignment assist/s in the reduction of overlap region in fiber?

a. Angular
b. Longitudinal
c. Lateral
d. All of the above

ANSWER: (c) Lateral

18) Which is the correct order of sequential steps for an electric arc fusion technique?

A. Pressing of fiber ends for fusion
B. Application of heat for smoothening of end-surfaces

C. Alignment of broken fiber edges

a. A, B, C
b. B, A, C
c. C, B, A
d. C, A, B

ANSWER: (c) C, B, A

19) Which splicing technique involves the alignment and locking of broken fiber edges by means of positioning devices & optical cement?

a. Fusion
b. Mechanical
c. Both a and b
d. None of the above

ANSWER:(b) Mechanical

20) By using Springroove splicing technique, what is the value of mean insertion loss for multi mode graded index fiber?

a. 0.01
b. 0.03
c. 0.05
d. 0.09

ANSWER: (c) 0.05

21) In the fiber optic link, power transfer from one fiber to another and from fiber to detector must take place with _____coupling efficiency.

a. maximum
b. stable
c. minimum
d. unpredictable

ANSWER: (a) maximum

22) In spontaneous emission, the light source in an excited state undergoes the transition to a state with _____

a. Higher energy
b. Moderate energy
c. Lower energy

d. All of the above

ANSWER: (c) Lower energy

23) Which among the following is a key process adopted for the laser beam formation as it undergoes the light amplification?

a. Spontaneous Emission
b. Stimulated Emission
c. Both a and b
d. None of the above

ANSWER: (b) Stimulated Emission

24) While coupling of LEDs with fiber, on which factor/s does the size of source and lighting angle generated within the semiconductor depend/s?

a. Geometry of die
b. Refractive index of semiconductor
c. Encapsulation Medium
d. All of the above

ANSWER: (d) All of the above

25) Which among the following results in the removal of LED lens interface for achieving high coupling efficiency?

a. Spherical lens
b. Cylindrical lens
c. Integral lens LED
d. All of the above

ANSWER: (c) Integral lens LED

26) For a photo-diode with responsivity of 0.50 A/W & optical power of about 12µW, what would be the value of generated photocurrent?

a. 3 µA
b. 6 µA
c. 9 µA
d. 12 µA

ANSWER: (b) 6 µA

27) Which component of an optical receiver is a linear frequency shaping filter used for the compensation of signal distortion and Inter Symbol Interference (ISI)?

a. Photodetector
b. Amplifier
c. Equalizer
d. None of the above

ANSWER: (c) Equalizer

28) In digital receivers, which codes are used to designate the sampled analog signals after their quantization into discrete levels?

a. Binary
b. Decimal
c. ASCII
d. Excess-3

ANSWER: (a) Binary

29) Which feature of an eye-diagram assists in the measurement of additive noise in the signal?

a. Eye opening (height, peak to peak)
b. Eye overshoot/ undershoot
c. Eye width
d. None of the above

ANSWER: (a) Eye opening (height, peak to peak)

30) Which method determines the dispersion limitation of an optical link?

a. Link power budget
b. Rise time budget
c. Both a and b
d. None of the above

ANSWER: (b) Rise time budget

31) Which phenomenon causes the dynamic line width broadening under the direct modulation of injection current?

a. Modal Noise
b. Mode-partition Noise
c. Frequency Chirping

d. Reflection Noise

ANSWER: (c) Frequency Chirping

32) Speckle pattern is generated due to interference of nodes from a coherent source especially when the coherence time of source is _____ the intermodal dispersion time in the fiber.

a. Less than
b. Greater than
c. Equal to
d. None of the above

ANSWER: (b) Greater than

33) Which among the following is/are determined by the fiber characterization?

a. Fiber integrity & performance for desired transmission rate
b. Installation practices
c. Service Implementation
d. All of the above

ANSWER: (d) All of the above

34) From the tests carried out in fiber characterization, which among the following measures the total light reflected back to the transmitter caused by the fiber as well as the components like connector pairs and mechanical splices?

a. ORL
b. OTDR
c. LTS
d. PMD

ANSWER: (a) ORL

35) In fiber fault location, the equation of length (l) for time difference (t) is expressed as L = ct / 2n1 . Which factor in this equation implies that the light travels a length from source to break point and then through another length on the return trip?

a. L
b. c
c. t
d. 2

ANSWER: (d) 2

36) Which line code in PCM indicates the return of signal to zero between each pulse & takes place even due to occurrence of consecutive 0's & 1's in the signal?

a. Return-to-zero (RZ)
b. Non-Return to zero space
c. Return to zero inverted
d. Non-return to zero inverted

ANSWER: (a) Return-to-zero (RZ)

37) In the structure of fiber, the light is guided through the core due to total internal _____

a. reflection
b. refraction
c. diffraction
d. dispersion

ANSWER: (a) reflection

38) In the structure of a fiber, which component provides additional strength and prevents the fiber from any damage?

a. Core
b. Cladding
c. Buffer Coating
d. None of the above

ANSWER: (c) Buffer Coating

39) Which is the transmission medium for VLF electromagnetic waves especially applicable for aeronautical and submarine cables?

a. Paired wires
b. Coaxial cable
c. Waveguide
d. Wireless

ANSWER: (a) Paired wires

40) Which rays exhibit the variation in the light acceptability ability of the fiber?

a. Meridional
b. Skew
c. Leaky
d. All of the above

ANSWER: (b) Skew

41) If a fiber operates at 1400nm with the diameter of about 10 µm, n1 = 1.30, Δ = 0.80% , V = 3.5, then how many modes will it have?

a. 6.125
b. 9.655
c. 12.95
d. 16.55

ANSWER: (a) 6.125

42) Which kind of dispersion phenomenon gives rise to pulse spreading in single mode fibers?

a. Intramodal
b. Intermodal
c. Material
d. Group Velocity

ANSWER: (a) Intramodal

43) With respect to single mode and graded index fibers, which parameter specifies the propagation of polarization modes with different phase velocities & the difference between their effective refractive indices?

a. Mode field diameter
b. Birefringence
c. Fiber beat length
d. Spot Size

ANSWER: (b) Birefringence

44) On which of the following factor/s do/does the 'Hydrogen Effect' depend/s?

a. Type of fiber & Cable Design
b. Operating Wavelength
c. Installation Method
d. All of the above

ANSWER: (d) All of the above

45) Consider the statements given below. Which among them is not a drawback of double crucible method?

a. Utility in mass production of fibers
b. High attenuation
c. High OH content in drawn fiber
d. Addition of impurity while the fiber is drawn

ANSWER: (a) Utility in mass production of fibers

46) Consider the assertions given below. Which is the correct sequential order of process adopted in glass fiber preparation?

A. Drawing of fiber
B. Production of pure glass
C. Pulling of fiber
D. Conversion of pure glass into preform

a. B, D, A, C
b. A, B, C, D
c. C, A, D, B
d. D, B, A, C

ANSWER: (a) B, D, A, C

47) At which level of temperature does the oxidation process occur in MCVD?

a. Low
b. Moderate
c. High
d. Unpredictable

ANSWER: (c) High

48) Assuming no ISI, the maximum possible bandwidth of a multimode graded index fiber with 5 MHz, shows the total pulse broadening of 0.1s for the distance of about 12km. What would be the value of bandwidth length product?

a. 40 MHz
b. 60 MHz
c. 90 MHz
d. 120 MHz

ANSWER: (b) 60 MHz

49) In Rayleigh scattering of light in glass, at which type of temperature does the glass attain the state of thermal equilibrium and exhibits its relativity to annealing temperature?

a. Junction
b. Fictive
c. Breakdown
d. Decomposition

ANSWER: (b) Fictive

50) Which type of scattering occurs due to interaction of light in a medium with time dependent optical density variations thereby resulting into the change of energy (frequency) & path?

a. Stimulated Brilliouin Scattering (SBS)
b. Stimulated Raman Scattering (SRS)
c. Mie Scattering
d. Rayleigh Scattering

ANSWER: (a) Stimulated Brilliouin Scattering (SBS)

Founded the wave theory of light
a. Francesco Grimaldi
b. Edward Appleton
c. James Clerk Maxwell
d. Christian Huygens

Answer: Option D

2. Proposed the use of clad glass fiber as a dielectric waveguide
a. Karpon and Keck
b. Karpon and Bockham
c. Bockham and Kao
d. Kao and Keck

Answer: Option C

3. Developed the first laser
a. Charles Townes
b. Theodore Maiman
c. Gordon McKenzie
d. Albert Einstein

Answer: Option B

4. The band of light wavelengths that are too long to be seen by the human eye

a. Amber
b. Visible
c. Infrared
d. Ultraviolet

Answer: Option C

5. The band of light wavelengths that are too short to be seen by the human eye
a. Amber
b. Visible
c. Infrared
d. Ultraviolet

Answer: Option C

6. Which color has the shortest wavelength of light?
a. Red
b. Yellow
c. Blue
d. Green

Answer: Option C

7. What generates a light beam of a specific visible frequency?
a. Laser
b. Maser
c. Infrared
d. Flashlight

Answer: Option A

8. Which of the following materials is sensitive to light?
a. Photoresist
b. Photosensitive
c. Light Sensitive
d. Maser

Answer: Option A

9. The core of an optical fiber has a
a. Lower refracted index than air
b. Lower refractive index than the cladding
c. Higher refractive index than the cladding
d. Similar refractive index with the cladding

Answer: Option C

10. Is the different angle of entry of light into an optical fiber when the diameter of the core is many times the wavelength of the light transmitted.
a. Acceptance angle
b. Modes
c. Sensors
d. Aperture

Answer: Option B

11. The loss in signal power as light travels down a fiber is called
a. Dispersion
b. Scattering
c. Absorption
d. Attenuation

Answer: Option D

12. The bandwidth of optical fiber
a. 900M Hz
b. 900 PHz
c. 900 THz
d. 900 EHz

Answer: Option C

13. If a mirror is used to reflect light, the reflected light angle is ____ as the incident angle
a. Smaller
b. Larger
c. The same
d. Independent

Answer: Option C

14. What is a specific path the light takes in an optical fiber corresponding to a certain angle and number of reflection
a. Mode
b. Grade
c. Numerical Aperture
d. Dispersion

Answer: Option A

15. Is the width of the range of wavelengths emitted by the light source

a. Bandwidth
b. Chromatic Dispersion
c. Spectral width
d. Beamwidth

Answer: Option C

16. Which theory states that the light wave behaves as if it consists of many tiny particles?
a. Huygen's theory
b. Wave theory of light
c. Nyquist theory
d. Quantum theory

Answer: Option D

17. Fiber optic cables operate at frequencies near
a. 20 MHz
b. 200 MHz
c. 2G Hz
d. 800 THz

Answer: Option D

18. When a beam of light enters one medium from another, which quantity will not change?
a. Direction
b. Speed
c. Frequency
d. Wavelength

Answer: Option C

19. Dispersion is used to describe the
a. Splitting of white light into its component colors
b. Propagation of light in straight lines
c. Bending of a beam of light when it goes from one medium to another
d. Bending of a beam light when it strikes a mirror

Answer: Option A

20. Luminance efficiency is minimum for a
a. Fluorescent tube
b. High wattage light bulb
c. Mercury vapor lamp
d. Low wattage light bulb

Answer: Option D

21. An object farther from a converging lens than its focal point always has a/an _____ image.
a. Inverted
b. The same in size
c. Virtual
d. Smaller size

Answer: Option A

22. An object nearer to a converging lens than its focal point always has a/an _____ image.
a. Inverted
b. The same in size
c. Virtual
d. Smaller size

Answer: Option C

23. The real image formed by a spherical mirror is ____ relative to its object
a. Erect
b. Inverted
c. Smaller
d. Larger

Answer: Option D

24. The wavelength of light has no role in
a. Diffraction
b. Interference
c. Polarization
d. Reflection

Answer: Option C

25. Longitudinal waves do not exhibit
a. Polarization
b. Refraction
c. Reflection
d. Diffraction

Answer: Option A

26. _____ dispersion is caused by the difference in the propagation times of light rays that take different paths down a fiber.
a. Material dispersion

b. Wavelength dispersion
c. Modal dispersion
d. Delay dispersion

Answer: Option C

27. What is the average insertion loss of fusion splice in fiber optics?
a. 0.09 dB
b. 0.9 dB
c. 0.19 dB
d. 0.009 dB

Answer: Option A

28. What is the insertion loss of connector-type splices for a single mode fiber optics?
a. 0.51 dB
b. 0.31 dB
c. 0.49 dB
d. 0.38 dB

Answer: Option D

29. What is the lifetime of LEDs?
a. 200,000 minutes
b. 200,000 hours
c. 150,000 minutes
d. 150,000 hours

Answer: Option B

30. What is the lifetime of ILDs?
a. 50,000 hours
b. 75,000 hours
c. 100,000 hours
d. 125,000 hours

Answer: Option A

31. Photodiodes used as fiber optic directors are
a. Unbiased to generate a voltage same as a solar cell
b. Forward bias
c. Reversed bias
d. Thermoelectrically cooled

Answer: Option C

32. What type of fiber has the highest modal dispersion?
a. Step-index multimode
b. Graded index multimode
c. Step-index single mode
d. Graded index mode

Answer: Option A

33. Laser light is _____ emission.
a. Coherent
b. Stimulated
c. Spontaneous
d. Coherent and stimulated

Answer: Option D

34. A dielectric waveguide for the propagation of electromagnetic energy at light frequencies
a. Stripline
b. Microstrip
c. Laser beam
d. Fiber optics

Answer: Option D

35. Is a non-coherent light source foe optical communications system.
a. ILD
b. LED
c. APD
d. PIN Diode

Answer: Option B

36. Which type of laser is the simplest to modulate directly by changing its excitation?
a. Semiconductor
b. Ruby
c. Helium-neon
d. Neodymium-YAG

Answer: Option A

37. Which laser emits light in the visible range 400 to 700 nm?
a. Argon-ion
b. Nitrogen
c. Carbon-dioxide

d. Neodymium-YAG

Answer: Option A

38. Which is the proper measurement of average power emitted by a pulsed laser?
a. Energy x time
b. Pulse energy x repetition rate
c. Pulse energy / repetition rate
d. Peak power x pulse length

Answer: Option B

39. What is the photon energy for an infrared wave with frequency of 10^12 Hz?
a. 10.6 x 10^34 joules
b. 6.63 x 10^-34 joules
c. 6.63 x 10^-22 joules
d. 10.6 x 10^22 joules

Answer: Option C

40. A positive lens with a focal length of 10 cm forms a real image of an object 20 cm away from the lens. How far is the real image from the lens?
a. 5 cm
b. 10 cm
c. 15 cm
d. 20 cm

Answer: Option D

41. Which of the following factor does not harm laser efficiency?
a. Atmospheric absorption
b. Excitation energy not absorbed
c. Problems in depopulating the lower laser level
d. Inefficiency in populating the upper laser level

Answer: Option A

42. Which of the following contributes to the broadening of laser emission bandwidth?
a. Doppler shift of moving atoms and molecules
b. Amplification within the laser medium
c. Coherence of the laser light
d. Optical pumping of the laser transition

Answer: Option A

43. The first laser emitted
a. Pulses of 694 nm red light
b. A continuous red beam
c. Pulses of white light from a helical flash lamp
d. Spontaneous emission

Answer: Option A

44. What is the stage of the sand becoming a silicon?
a. Liquid
b. Gas
c. Molten
d. Hot

Answer: Option C

45. Which of the following is used as an optical transmitter on the Fiber Optical Communications?
a. APD
b. LSA diode
c. PIN diode
d. LED

Answer: Option D

46. Which of the following is used as an optical receiver in fiber optics communications
a. APD
b. Tunnel diode
c. Laser diode
d. LED

Answer: Option A

47. The numerical aperture of a fiber if the angle of acceptance is 15 degrees, is
a. 017
b. 0.26
c. 0.50
d. 0.75

Answer: Option B

48. The inner portion of the fiber cable is called
a. Cladding
b. Coating
c. Inner conductor
d. Core

Answer: Option D

49. Which type of laser is the simplest to modulate directly by changing its excitation?
a. Semiconductor
b. Ruby
c. Helium-neon
d. Neodymium-YAG

Answer: Option A

50. The laser frequency when the light has the wavelength 800 nm is
a. 375 x 10^12 Hz
b. 475 x 10^15 Hz
c. 375 x 10^9 Hz
d. 375 x 10^18 Hz

Answer: Option A

51. Which of the following is not a common application of fiber-optic cable?

a. Computer networks

b. Long-distance telephone systems

c. Closed circuit TV

d. Consumer TV

View Answer:
Answer: Option D

Solution:

52. Total internal reflection takes place if the light ray strikes the interface at an angle with what relationship to the critical angle?

a. Less than

b. Greater than

c. Equal to

d. Zero

View Answer:
Answer: Option B

Solution:

53. The operation of the fiber-optic cable is based on the principle of

a. Refraction

b. Reflection

c. Dispersion

d. Absorption

View Answer:
Answer: Option B

Solution:

54. Which of the following is not a common type of fiber-optic cable?

a. Single-mode step-index

b. Multimode graded-index

c. Single-mode graded-index

d. Multimode step-index

View Answer:
Answer: Option C

Solution:

55. Cable attenuation is usually expressed in terms of

a. Loss per foot

b. dB/km

c. intensity per mile

d. voltage drop per inch

View Answer:
Answer: Option B

Solution:

56. Which of the cable length has the highest attenuation?

a. 1 km

b. 2 km

c. 95 ft

d. 5500 ft

View Answer:
Answer: Option B

Solution:

57. The upper pulse rate and information carrying capacity of a cable is limited by

a. Pulse shortening

b. Attenuation

c. Light leakage

d. Modal dispersion

View Answer:
Answer: Option D

Solution:

58. The core of a fiber optic cable is made of

a. Air

b. Glass

c. Diamond

d. Quartz

View Answer:
Answer: Option B

Solution:

59. The core of a fiber optic is surrounded by

a. Wire braid shield

b. Kevlar

c. Cladding

d. Plastic insulation

View Answer:
Answer: Option C

Solution:

60. The speed of light in plastic compared to the speed of light in air is

a. Slower

b. Faster

c. The same

d. Either lower or faster

View Answer:
Answer: Option A

Solution:

61. Which of the following is not a major benefit of fiber-optic cable?

a. Immunity from interference

b. No electrical safety problems

c. Excellent data security

d. Lower cost

View Answer:
Answer: Option B

Solution:

62. The main benefit of light-wave communications over microwaves or any other communications media is

a. Lower cost

b. Better security

c. Wider bandwidth

d. Freedom from interference

View Answer:
Answer: Option C

Solution:

63. Which of the following is not part of the optical spectrum?

a. Infrared

b. Ultraviolet

c. Visible color

d. X-rays

View Answer:
Answer: Option D

Solution:

64. The wavelength of visible light extends from

a. 0.8 to 1.0 nm

b. 400 to 750 nm

c. 200 to 660 nm

d. 700 to 1200 nm

View Answer:
Answer: Option B

Solution:

65. The speed of light is

a. 186,000 mi/h

b. 300 mi/h

c. 300,000 m/s

d. 300,000,000 m/s

View Answer:
Answer: Option D

Solution:

66. Refraction is the

a. Bending of light waves

b. Reflection of light waves

c. Distortion of light waves

d. Diffusion of light waves

View Answer:
Answer: Option A

Solution:

67. The ratio of speed of light in air to the speed of light in another substance is called the

a. Speed factor

b. Index of reflection

c. Index of refraction

d. Dielectric constant

View Answer:
Answer: Option C

Solution:

68. A popular light wavelength in fiber-optic cable is

a. 0.7 μm

b. 1.3 μm

c. 1.5 μm

d. 1.8 μm

View Answer:
Answer: Option B

Solution:

69. Which type of fiber optic cable is most widely used?

a. Single-mode step-index

b. Multimode step-index

c. Single-mode graded-index

d. Multimode graded-index

View Answer:
Answer: Option A

Solution:

70. Which type of fiber-optic cable is the best for very high speed data?

a. Single-mode step-index

b. Multimode step-index

c. Single-mode graded-index

d. Multimode graded-index

View Answer:
Answer: Option A

Solution:

71. Which type of fiber-optic cable has the least modal dispersion?

a. Single mode step-index

b. Multimode step-index

c. Single-mode graded-index

d. Multimode graded-index

View Answer:
Answer: Option A

Solution:

72. Which of the following is not a factor in cable light loss?

a. Reflection

b. Absorption

c. Scattering

d. Dispersion

View Answer:
Answer: Option A

Solution:

73. A distance of 8 km is the same as

a. 2.5 mi

b. 5 mi

c. 8 mi

d. 12.9 mi

View Answer:
Answer: Option B

Solution:

74. A fiber-optic cable has a loss of 15 dB/km. The attenuation in a cable, 100 ft long is

a. 4.57 dB

b. 9.3 dB

c. 24 dB

d. 49.2 dB

View Answer:
Answer: Option A

Solution:

75. Fiber-optic cables with attenuations of 1.8, 3.4, 5.9, and 18 dB are linked together. The total loss is

a. 7.5 dB

b. 19.8 dB

c. 29.1 dB

d. 650 dB

View Answer:
Answer: Option C

Solution:

76. Which light emitter is preferred for high speed data in a fiber-optic system

a. Incandescent

b. LED

c. Neon

d. Laser

View Answer:
Answer: Option D

Solution:

77. Most fiber-optic light sources emit light in which spectrum?

a. Visible

b. Infrared

c. Ultraviolet

d. X-ray

View Answer:
Answer: Option B

Solution:

78. Both LEDs and ILDs operate correctly with

a. Forward bias

b. Reverse bias

c. Neither A or B

d. Either A or B

View Answer:
Answer: Option A

Solution:

79. Single-frequency light is called

a. Pure

b. Intense

c. Coherent

d. Monochromatic

View Answer:
Answer: Option D

Solution:

80. Laser light is very bright because it is

a. Pure

b. White

c. Coherent

d. Monochromatic

View Answer:
Answer: Option C

Solution:

81. Which of the following is NOT a common light detector

a. PIN photodiode

b. Photovoltaic diode

c. Photodiode

d. Avalanche photodiode

View Answer:
Answer: Option B

Solution:

82. Which of the following is the fastest light sensor

a. PIN photodiode

b. Photovoltaic diode

c. Phototransistor

d. Avalanche photodiode

View Answer:
Answer: Option D

Solution:

83. Photodiodes operate property with

a. Forward bias

b. Reverse bias

c. Neither A or B

d. Either A or B

View Answer:
Answer: Option B

Solution:

84. The product of the bit rate and distance of a fiber-optic system is 2 Gbits km/s. What is the maximum rate at 5 km?

a. 100 Mbits/s

b. 200 Mbits/s

c. 400 Mbits/s

d. 1000 Gbits/s

View Answer:
Answer: Option C

Solution:

85. Which fiber-optic system is better?

a. 3 repeaters

b. 8 repeaters

c. 11 repeaters

d. 20 repeaters

View Answer:
Answer: Option A

Solution:

**1. The macroscopic bending losses show an exponential increase due to _____ in radius of curvature.**

A. Increase
**B. Decrease**
C. Stability
D. None of the above

**2. Which type of mechanical splicing exhibits the permanent bonding of prepared fiber ends with the rigid alignment of the tube?**

**A. Snug Tube Splicing**
B. Loose Tube Splicing
C. Elastomeric Splicing
D. Precision Pin Splicing

**3. Which component of fiber-optic connector has a provision of entry for the fiber along with the fixation to connector housing?**

A. Ferrule
**B. Cable**
C. Connector Housing
D. Coupling Device

**4. Which among the following is regarded as a keyed bayonet connector along with its feasibility of easiest insertion and removal from the fiber optic cable?**

A. FC Connectors
B. LC Connectors
C. MT-RJ Connectors
**D. ST Connectors**

**5. How many mating cycles are being rated by typically matched SC Connectors?**

A. 500
B. 600
C. 800
**D. 1000**

**6. In Stimulated Emission, which among the following parameters of generated photon is/are similar to the photon of incident wave?**

A. Phase
B. Frequency
C. Polarization & direction of travel
**D. All of the above**

**7. Consider a crystal of ruby laser whose length is 6 cm and the refractive index is 1.8, emits the wavelength of about 0.55 μm. What will be the value of number of longitudinal modes?**

**A. 3.9 x 105**
B. 4.9 x 105
C. 5.6 x 105
D. 7.7 x 105

**8. In a laser structure, the existence of standing waves is possible at frequencies for which the distance between the mirrors is an integral number of _____**

**A. λ / 2**
B. λ / 4
C. λ / 6
D. λ / 8

**9. The small section of fiber which is coupled to the optical source is known as _____**

A. Flylead
B. Pigtail
**C. Both a and b**
D. None of the above

**10. In Lambertian output pattern of LED, the source is _____ bright from all directions.**

A. Less
**B. Equally**
C. More
D. Unpredictably

**11. In pyroelectric photo detectors, the consequent increase in dielectric constant due to temperature variation by the photon absorption, is generally measured as change in _____**

A. resistance
B. inductance
C. admittance
**D. capacitance**

**12. Which type of preamplifier plays a crucial role in reducing the effect of thermal noise?**

A. Low Impedance Pre-amplifier
**B. High Impedance Preamplifier**
C. Transimpedance Preamplifier
D. None of the above

**13. In high impedance preamplifier, how are the noise sources kept to minimum level?**

A. By reducing dark current with proper selection of photodiode
B. By reducing thermal noise of biasing resistor
C. By using high impedance amplifier
**D. All of the above**

**14. Which among the following are the disadvantages of an optical feedback transimpedance receiver?**

A. Increase in receiver input capacitance
B. Increase in dark current
C. Decrease in receiver input capacitance
D. Decrease in dark current

**A. A & B**
B. C & D
C. A & D
D. B & C

**15. Which category/ies of wavelength division multiplexer comprise/s two 3dB couplers where the splitting of an incident beam takes place into two fiber paths, followed by the recombination with second 3-dB coupler?**

A. Interference filter based devices
B. Angular dispersion based devices
**C. Mach-Zehnder Interferometers**
D. All of the above

**16. Which among the following controls the length of Fabry-Perot interferometer so that it can act as a tunable optical filter?**

**A. Transducer**
B. Tachometer

C. Multimeter
D. Phase-meter

**17. In circulator, an optical path of signal follows _____**

A. An open loop
**B. A closed loop**
C. Both a and b
D. None of the above

**18. Which among the following is/are responsible for generating attenuation of an optical power in fiber?**

A. Absorption
B. Scattering
C. Waveguide effect
**D. All of the above**

**19. Consider the assertions/ characteristics given below. Which type of attenuation measurement technique exhibits these characteristics?**

1. Necessity of accessing both ends of fiber.
2. Measurements corresponding to specific wavelengths.
3. Requirement of spectral response over a range of wavelengths.

**A. Cutback Technique**
B. Insertion Loss Technique
C. Use of OTDR Technique
D. None of the above

**20. For neglecting the pulse dispersion in the digital systems, the rms width of fiber impulse response must be _____one-quarter of the pulse spacing.**

**A. Less than**
B. Equal to
C. Greater than
D. None of the above

**21. If a noisy channel has a bandwidth of 4 MHz with signal to noise ratio of about 1, what would be the maximum capacity of the channel?**

A. 2 Mb/sec
**B. 4 Mb/sec**
C. 6 Mb/sec
D. 8 Mb/sec

**22. In the structure of fiber optic cable, the refractive index of core is always _____the refractive index of cladding.**

A. Less than
B. Equal to
**C. Greater than**
D. None of the above

**23. The order of mode is equal to the number of field____ across the guide.**

**A. Zeros**
B. Poles
C. Ones
D. All of the above

**24. Which among the following represents the lateral shift of a light beam on reflection at a dielectric interface?**

A. Doppler's Shift
**B. Goos-Haenchen's Shift**
C. Frequency Shift
D. Phase Shift

**25. Why are plastic clad silica fiber optic cables not used widely?**

A. Difficulty in connector application due to excessive plasticity in cladding
B. Difficulty in bonding

C. Insolubility in organic solvents
**D. All of the above**

**26. In cables, water is prevented from filling the spaces with _____resistant compounds.**

**A. moisture**
B. pressure
C. temperature
D. stress

**27. Which reason/s is/are responsible for the occurrence of non-linear Cross Phase Modulation (XPM)?**

A. Difference in transmission phase of peak pulse & leading or trailing edges of pulse
B. Third-order optical non-linearity
**C. Intensity dependence of refractive index**
D. All of the above

**28. What is/ are the consequence/s of Self Phase Modulation in non-linear optics?**

A. Modification in pulse spectrum
B. Limited transmission rate
C. Dispersion effect
**D. All of the above**

**29. Which type of fiber-optic coupler causes the distribution of an optical power from more than two input ports among the several output ports?**

**A. Star Coupler**
B. Tree Coupler
C. X Coupler
D. All of the above

**30. Which optical devices are adopted or applicable for routing signals from one waveguide to another?**

A. Optical Combiner
B. Optical Splitter
**C. Optical Coupler**
D. None of the above

**31. Which among the following characteristics of Laser light specifies the precise movement of all individual light waves together through time and space?**

A. Monochromatic
B. Directional
**C. Coherent**
D. Brightness

**32. Which modes are acknowledged due to their association with electromagnetic field and beam profile in the direction perpendicular to the plane of pn junction?**

A. Longitudinal Modes
**B. Transverse Modes**
C. Lateral Modes
D. All of the above

**33. Which type of injection laser involves the use of geometry for fabrication of the multimode injection laser with a single or small number of lateral modes?**

**A. Gain guided laser**
B. Index guided laser
C. Quantum well laser
D. Quantum dot laser

**34. In the dynamic response of Injection Laser Diode (ILD), the delay which is followed by ____ frequency damped oscillations give rise to the generation of relaxation oscillations.**

A. Low
B. Medium

**C. High**
D. All of the above

**35. The spectral response of an ideal photodetector depicts its efficiency as a function of _____**

A. amplitude
B. frequency
C. period
**D. wavelength**

**36. According to frequency response of photo-detector, the modulation frequency at which the output current decreases to _____of peak value.**

A. one-third
B. one-fourth
**C. half**
D. one-tenth

**37. Which photo diodes are crucially applicable to overcome the bandwidth-quantum efficiency trade-off along with its resemblence to the pyramid structure?**

**A. Mushroom Waveguide Photodiode**
B. Traveling Wave Photodiode
C. Resonant Cavity Photodiode
D. All of the above

**38. When an optical signal is incident on a photo-detector, which noise originate/s due to statistical nature of production and collection of photoelectrons?**

A. Dark Current Noise
**B. Quantum Noise**
C. Surface Leakage Current noise
D. All of the above

**39. In an eye-diagram, digital signals with very bad interference resembles the shape of _____**

A. circle
B. rectangle
C. triangle
**D. straight line**

**40. On which factor/s do/does the response time of photodiode depend/s?**

A. Diffusion time of photo carriers outside the depletion region
B. Diffusion time of photo carriers within the depletion region
C. RC time constant
**D. All of the above**

**41. Which nature of charge carriers give rise to the current fluctuations thereby resulting into the generation of shot noise?**

A. Continuous
**B. Discrete**
C. Sampled
D. All of the above

**42. Which among the following parameters is/are decided by the front-end of a receiver?**

A. Sensitivity
B. Bandwidth
**C. Both a and b**
D. None of the above

**43. In an optical network, increase in the number of lasers _____the bit rate.**

**A. Increases**
B. Stabilizes
C. Decreases
D. None of the above

**44. Which band/s specify/ies the operation range of Erbium doped fiber amplifier (EDFA)?**

A. By O band
**B. By C band**
C. By S band
D. All of the above

**45. Basically, solitons are pulses which propagates through the fiber without showing any variation in _____**

A. Amplitude
B. Velocity
C. Shape
**D. All of the above**

**46. Why is an electrical isolation required between several portions of an electronic circuit?**

A. Provision of high voltage protection
B. Reduction in noise level
**C. Both a & b**
D. None of the above

**47. For measuring the shape of input pulse in time-domain intermodal dispersion method, the test fiber is replaced by another fiber whose length is less than ___ of the test fiber.**

**A. 1%**
B. 5%
C. 10%
D. 20%

**48. In chromatic dispersion, which parameter for the modulation of the received signal is measured with the help of a vector voltmeter?**

A. Amplitude
B. Frequency
**C. Phase**
D. Period

**49. Which among the following stages is/are adopted in Splice Loss Experiment?**

A. Translational
B. Rotational
**C. Both a and b**
D. None of the above

**50. Which among the following misalignments give/gives rise to the occurrence of splice loss?**

A. Longitudinal separation between the end-faces of fiber
B. Angular tilt between fiber ends
C. Transverse offset between fiber ends
**D. All of the above**

**51. In an optical fiber communication system, which among the following is not a typical transmitter function?**

A. Coding for error protection
B. Decoding of input data
C. Electrical to optical conversion
**D. Recoding to match output standard**

**52. Which among the following is provided by an optical receiver for the regeneration of data signal with minimum error?**

A. Photo-diode
B. Signal Processing Circuits
**C. Linear Circuitry**
D. None of the above

**53. For a sine wave, the frequency is represented by the cycles per _____**

**A. Second**
B. Minute

C. Hour
D. None of the above

**54. Which property/ies of PCM stream determine/s the fidelity to original analog signal?**

A. Sampling rate
B. Bit depth
**C. Both a and b**
D. None of the above

**55. In single-mode fibers, how does the fraction of energy traveling through bound mode appear in the cladding?**

A. As a crescent wave
B. As a gibbous wave
**C. As an evanescent wave**
D. All of the above

**56. What is the typical value of refractive index for an ethyl alcohol?**

A. 1
**B. 1.36**
C. 2.6
D. 3.4

**57. If a light travels in a certain medium and it gets reflected off an optically denser medium with high refractive index, then it is regarded as _____**

**A. External Reflection**
B. Internal Reflection
C. Both a and b
D. None of the above

**58. In an optical fiber, the concept of Numerical aperture is applicable in describing the ability of _____**

**A. Light Collection**
B. Light Scattering
C. Light Dispersion
D. Light Polarization

**59. Which among the following do/does not support/s the soot formation process?**

A. OVPO
B. MCVD
**C. PCVD**
D. All of the above

**60. Which type of photonic crystal fiber exhibit/s its/their similarity to the periodic crystalline lattice in a semiconductor?**

A. Index guiding fiber
**B. Photonic bandgap fiber**
C. Both a and b
D. None of the above

**61. Which type of fiber optic cable has/have its/their core with the size of about 480 µm to 980 µm & made up of polymethylmethacrylate (PMMA)?**

A. Glass fiber optic cable
**B. Plastic fiber optic cable**
C. Plastic clad silica fiber optic cable
D. All of the above

**62. In multifiber cable system, which form of outer jacket/s consist/s of polyolefin compounds and are regarded as halogen free?**

A. OFNR
B. OFNP
**C. LSZH**
D. All of the above

**63. During the design of FOC system, which among the following reasons is/are responsible for an extrinsic absorption?**

A. Atomic defects in the composition of glass
**B. Impurity atoms in glass material**
C. Basic constituent atoms of fiber material
D. All of the above

**64. Which among the following represent/s the measure/s to minimize the inhomogenities for Mie scattering reduction?**

A. Extrusion Control
B. Increase in relative R.I. difference
C. Removal of imperfections due to glass manufacturing process
**D. All of the above**

**65. In Kerr effect, induced index change has its proportionality with respect to _____**

**A. square of electric field**
B. cube of electric field
C. cube root of electric field
D. one-fourth power of electric field

**66. Which among the following is regarded as an inelastic scattering of a photon?**

A. Kerr Effect
**B. Raman Effect**
C. Hall Effect
D. Miller Effect

**67. Which kind/s of misalignment assist/s in the reduction of overlap region in fiber?**

A. Angular
B. Longitudinal
**C. Lateral**
D. All of the above

**68. Which is the correct order of sequential steps for an electric arc fusion technique?**

A. Pressing of fiber ends for fusion
B. Application of heat for smoothening of end-surfaces
C. Alignment of broken fiber edges

A. A, B, C
B. B, A, C
**C. C, B, A**
D. C, A, B

**69. Which splicing technique involves the alignment and locking of broken fiber edges by means of positioning devices & optical cement?**

A. Fusion
**B. Mechanical**
C. Both a and b
D. None of the above

**70. By using Springroove splicing technique, what is the value of mean insertion loss for multi mode graded index fiber?**

A. 0.01
B. 0.03
**C. 0.05**
D. 0.09

**71. In the fiber optic link, power transfer from one fiber to another and from fiber to detector must take place with _____coupling efficiency.**

**A. maximum**
B. stable
C. minimum
D. unpredictable

**72. In spontaneous emission, the light source in an excited state undergoes the transition to a state with _____**

A. Higher energy
B. Moderate energy
**C. Lower energy**
D. All of the above

**73. Which among the following is a key process adopted for the laser beam formation as it undergoes the light amplification?**

A. Spontaneous Emission
**B. Stimulated Emission**
C. Both a and b
D. None of the above

**74. While coupling of LEDs with fiber, on which factor/s does the size of source and lighting angle generated within the semiconductor depend/s?**

A. Geometry of die
B. Refractive index of semiconductor
C. Encapsulation Medium
**D. All of the above**

**75. Which among the following results in the removal of LED lens interface for achieving high coupling efficiency?**

A. Spherical lens
B. Cylindrical lens
**C. Integral lens LED**
D. All of the above

**76. For a photo-diode with responsivity of 0.50 A/W & optical power of about 12µW, what would be the value of generated photocurrent?**

A. 3 µA
**B. 6 µA**
C. 9 µA
D. 12 µA

**77. Which component of an optical receiver is a linear frequency shaping filter used for the compensation of signal distortion and Inter Symbol Interference (ISI)?**

A. Photodetector
B. Amplifier
**C. Equalizer**
D. None of the above

**78. In digital receivers, which codes are used to designate the sampled analog signals after their quantization into discrete levels?**

**A. Binary**
B. Decimal
C. ASCII
D. Excess-3

**79. Which feature of an eye-diagram assists in the measurement of additive noise in the signal?**

**A. Eye opening (height, peak to peak)**
B. Eye overshoot/ undershoot
C. Eye width
D. None of the above

**80. Which method determines the dispersion limitation of an optical link?**

A. Link power budget
**B. Rise time budget**
C. Both a and b
D. None of the above

**81. Which phenomenon causes the dynamic line width broadening under the direct modulation of injection current?**

A. Modal Noise
B. Mode-partition Noise
**C. Frequency Chirping**
D. Reflection Noise

**82. Speckle pattern is generated due to interference of nodes from a coherent source especially when the coherence time of source is _____ the intermodal dispersion time in the fiber.**

A. Less than
**B. Greater than**
C. Equal to
D. None of the above

**83. Which among the following is/are determined by the fiber characterization?**

A. Fiber integrity & performance for desired transmission rate
B. Installation practices
C. Service Implementation
**D. All of the above**

**84. From the tests carried out in fiber characterization, which among the following measures the total light reflected back to the transmitter caused by the fiber as well as the components like connector pairs and mechanical splices?**

**A. ORL**
B. OTDR
C. LTS
D. PMD

**85. In fiber fault location, the equation of length (l) for time difference (t) is expressed as L = ct / 2n1 . Which factor in this equation implies that the light travels a length from source to break point and then through another length on the return trip?**

A. L
B. c
C. t
**D. 2**

**86. Which line code in PCM indicates the return of signal to zero between each pulse & takes place even due to occurrence of consecutive 0's & 1's in the signal?**

**A. Return-to-zero (RZ)**
B. Non-Return to zero space
C. Return to zero inverted
D. Non-return to zero inverted

**87. In the structure of fiber, the light is guided through the core due to total internal _____**

**A. reflection**
B. refraction
C. diffraction
D. dispersion

**88. In the structure of a fiber, which component provides additional strength and prevents the fiber from any damage?**

A. Core
B. Cladding
**C. Buffer Coating**
D. None of the above

**89. Which is the transmission medium for VLF electromagnetic waves especially applicable for aeronautical and submarine cables?**

**A. Paired wires**
B. Coaxial cable
C. Waveguide
D. Wireless

**90. Which rays exhibit the variation in the light acceptability ability of the fiber?**

A. Meridional
**B. Skew**
C. Leaky
D. All of the above

**91. If a fiber operates at 1400nm with the diameter of about 10 µm, n1 = 1.30, Δ = 0.80% , V = 3.5, then how many modes will it have?**

**A. 6.125**
B. 9.655
C. 12.95
D. 16.55

**92. Which kind of dispersion phenomenon gives rise to pulse spreading in single mode fibers?**

**A. Intramodal**
B. Intermodal
C. Material
D. Group Velocity

**93. With respect to single mode and graded index fibers, which parameter specifies the propagation of polarization modes with different phase velocities & the difference between their effective refractive indices?**

A. Mode field diameter
**B. Birefringence**
C. Fiber beat length
D. Spot Size

**94. On which of the following factor/s do/does the 'Hydrogen Effect' depend/s?**

A. Type of fiber & Cable Design
B. Operating Wavelength
C. Installation Method
**D. All of the above**

**95. Consider the statements given below. Which among them is not a drawback of double crucible method?**

**A. Utility in mass production of fibers**
B. High attenuation
C. High OH content in drawn fiber
D. Addition of impurity while the fiber is drawn

**96. Consider the assertions given below. Which is the correct sequential order of process adopted in glass fiber preparation?**

A. Drawing of fiber
B. Production of pure glass
C. Pulling of fiber
D. Conversion of pure glass into preform

**A. B, D, A, C**
B. A, B, C, D
C. C, A, D, B
D. D, B, A, C

**97. At which level of temperature does the oxidation process occur in MCVD?**

A. Low
B. Moderate
**C. High**
D. Unpredictable

**98. Assuming no ISI, the maximum possible bandwidth of a multimode graded index fiber with 5 MHz, shows the total pulse broadening of 0.1s for the distance of about 12km. What would be the value of bandwidth length product?**

A. 40 MHz
**B. 60 MHz**
C. 90 MHz
D. 120 MHz

**99. In Rayleigh scattering of light in glass, at which type of temperature does the glass attain the state of thermal equilibrium and exhibits its relativity to annealing temperature?**

A. Junction
**B. Fictive**
C. Breakdown
D. Decomposition

**100. Which type of scattering occurs due to interaction of light in a medium with time dependent optical density variations thereby resulting into the change of energy (frequency) & path?**

A. Stimulated Brilliouin Scattering (SBS)
**B. Stimulated Raman Scattering (SRS)**
C. Mie Scattering
D. Rayleigh Scattering

# “Introduction and Applications of Laser”.

1. What is the full form of LASER?
a) Light Absorbent and Stimulated Emission of Radiations
b) Light Absorbing Solar Energy Resource
c) Light Amplification by Stimulated Emission of Radiations
d) Light Amplification of Singular Emission of Radiations
View Answer
Answer: c
Explanation: LASER is a short form of Light Amplification by Stimulated Emission of Radiations. Stimulated Emission is the process by which amplification of radiations takes place. Hence the meaning of LASER that the light is amplified by stimulating the emission of radiations.

2. In Stimulated Absorption, what is the lifetime of atoms ground state?
a) 1 second
b) 1 minute
c) 1 hour
d) Infinity
View Answer
Answer: d
Explanation: At the ground state, the atoms are perfectly stable. They are under no excessive force that might lead to become unstable. All the forces are balanced. Thus, as the atom is stable in ground state, its lifetime is infinity.

3. Phonons are _____
a) Quanta of energy
b) Quanta of light waves
c) Quanta of sound waves
d) Quanta of heat
View Answer

Answer: c
Explanation: Phonons are the quanta of sound waves. When energy is provided, the lattice absorbs energy and gets excited to a higher state. When it de-excites to ground state, it releases radiation in sound-wave region, known as phonons.

4. Which of the following is not a characteristic of LASERS?
a) Monochromatic
b) Coherent
c) Divergent
d) Intense
View Answer
Answer: c
Explanation: The lasers are highly directional having almost no divergence. The output beam of laser has a well-defined wave front due to which it can be focused on a point.
Lasers are highly intense compared to ordinary light. They are monochromatic and coherent.

5. Laser is used in LIDAR for what purpose?
a) High-Speed Photography
b) Range finder
c) Optical Carrier signal
d) Drilling
View Answer
Answer: b
Explanation: LIDAR stand for Light Detection and Ranging. Laser is used in LIDAR as range finder. The transit time of transmitted and reflected pulse of laser light is recorded and the distance of the reflecting object is estimated.

6. The output of a laser has pulse duration of 30 ms and average output power of 1 W per pulse. How much energy is released per pulse if wavelength is 6600 Å?
a) 0.001 J
b) 0.002 J
c) 0.003 J
d) 0.004 J
View Answer
Answer: c
Explanation: As we know, Energy = Power X Time

= 1 W X 30 X $10^{-3}$s
= 0.003 J.

7. Laser light from a 2mW source of aperture diameter 1.5 cm and wavelength 5000 Å is focused by a lens of focal length 20 cm. The intensity of the image is _____
a) 1.57 X $10^{6}$ $Wm^{-2}$
b) 2.57 X $10^{6}$ $Wm^{-2}$
c) 3.57 X $10^{6}$ $Wm^{-2}$
d) 4.57 X $10^{6}$ $Wm^{-2}$
View Answer
Answer: c
Explanation: Area of the image = $\pi\lambda^2 f^2 a^2$
λ = 5000 Å = 5.0 X $10^{-7}$m, f = 0.2 m
a = 1.5/2 cm = 0.75 X $10^{-2}$ m
Putting in the formula we get, Are = 5.6 X $10^{-10}$ $m^2$
Intensity = Power/Area
= 2 X $10^{-3}$W/ 5.6 X $10^{-10}$ $m^2$
= 3.57 X $10^{6}$ $Wm^{-2}$.

8. For an ordinary light source, the coherence time t = $10^{-10}$ s. The degree of Monochromaticity for a wavelength of 6000 Å is _____
a) 0.1 X $10^{-4}$
b) 0.2 X $10^{-4}$
c) 0.3 X $10^{-4}$
d) 0.4 X $10^{-4}$
View Answer
Answer: b
Explanation: Coherence time, t = $10^{-10}$ s
Therefore, Δv = 1/t = $10^{10}$ Hz
Now, $\lambda_o$ = 5000 Å, $v_o$ = 5.0 X $10^{14}$ Hz
Monochromaticity = $\delta v v_0$
= 0.2 X $10^{-4}$.

9. Lasers are used for welding of wires because they can be focused onto a fine spot.
a) True
b) False
View Answer

Answer: a
Explanation: Laser beams are highly directional with almost no convergence. Thus, they can be focused onto a fine spot with ease. Due to this, they are used in welding of fine wires, contacts in miniature assemblies, drilling holes etc.

10. Where is ND: YAG most commonly used?
a) Cosmetic Surgery
b) Welding
c) Photography
d) Optical Communications
View Answer
Answer: a
Explanation: ND: YAG is most commonly used for cosmetic energy because it has the property of maximum energy absorption by the target (hair or lesion) with minimum absorption by the surrounding skin structures.

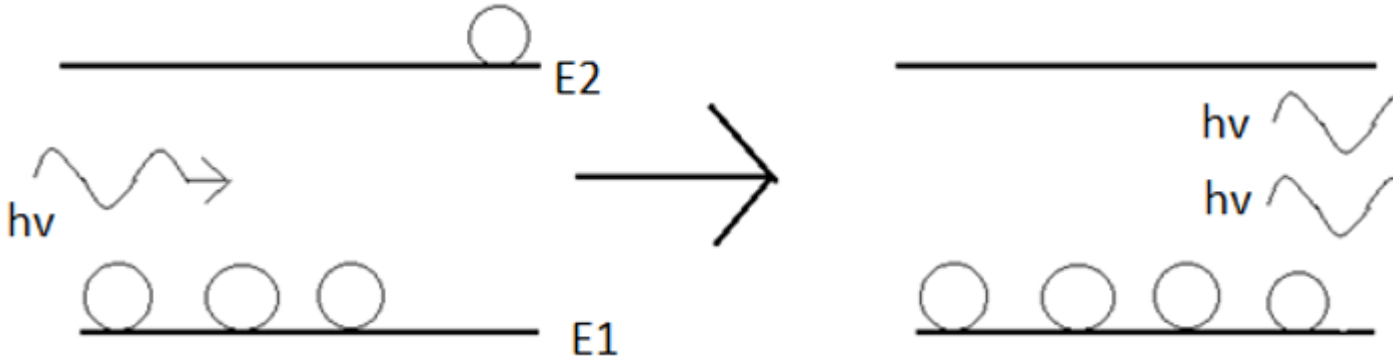
11. The information carrying capacity of laser is enormous due its large _____
a) Coherence
b) Bandwidth
c) Directionality
d) Intensity
View Answer
Answer: b
Explanation: Laser has a large bandwidth. The rate at which the information can be transmitted is proportional to bandwidth and the bandwidth is proportional to carrier frequency. Because of these properties, Laser is widely used as optical carrier signal.

12. Which characteristic of LASER allows it to be used in holography?
a) Coherency
b) Directionality
c) Intensity
d) Monochromaticity
View Answer
Answer: a
Explanation: The production of an image in a hologram takes place via a process called reconstruction. In this process, the image is

“reconstructed” in the form of a hologram. This reconstruction if possible, via LASER as they are highly coherent.

13. What is the region enclosed by the optical cavity called?
a) Optical Region
b) Optical System
c) Optical box
d) Optical Resonator
View Answer
Answer: d
Explanation: The optical cavity resembles an oscillator as it provides feedback of the photons by reflection, at the mirrors. Therefore, the area enclosed inside the optical cavity is called optical resonator.

14. The following graph is pictorial representation of _____




a) Spontaneous emission
b) Spontaneous Absorption
c) Stimulated emission
d) Stimulated Absorption
View Answer
Answer: c
Explanation: The diagram shows that when a photon from the incident radiation, having energy $E_2 – E_1$, interacts with the atom in excited state, the atom comes down to the ground state with the emission of a photon with same frequency, phase and direction of propagation.

## Laser Welding – 1

« Prev
Next »

This set of Manufacturing Processes Multiple Choice Questions & Answers (MCQs) focuses on “Laser Welding – 1”.

1. Laser beam welding is a _____ joining process.
a) fission
b) fusion
c) coherent
d) plastic
View Answer
Answer: b
Explanation: Laser is an acronym for light amplification by stimulated emission of radiation. Laser Beam Welding (LBW) is a fusion joining process that produces coalescence of materials with the heat obtained from a concentrated beam of coherent, monochromatic light impinging on the joint to be welded.

2. Which of the following is used to direct laser beam?
a) glass apertures
b) perforated glass sheets
c) flat optical elements
d) electro-magnetic coils
View Answer
Answer: c
Explanation: In the LBM process, the laser beam is directed by flat optical elements, such as mirrors and then focused to a small spot (for high power density) at the workpiece using either reflective focusing elements or lenses.

3. Inert gas shielding is generally employed to protect _____
a) laser beam
b) molten puddle of metal
c) filler electrode
d) lenses
View Answer
Answer: b
Explanation: It is a non-contact process, requiring no pressure to be applied. Inert gas shielding is generally employed to prevent oxidation of the molten puddle and filler metals may be occasionally used.

4. Which of the following is a commercially used laser?
a) Nd-GAG laser
b) 1.06 μm wavelength $CO_2$ laser
c) 2 μm wavelength $CO_2$ laser
d) Nd- YAS laser
View Answer
Answer: b
Explanation: The Lasers which are predominantly being used for industrial material processing and welding tasks are the Nd-YAG laser and 1.06 μm wavelength $CO_2$ laser, with the active elements most commonly employed in these two varieties of lasers being the neodymium (Nd) ion and the $CO_2$ molecules respectively.

5. In solid state laser _____ is used as a dopant.
a) actinium ion
b) neodymium ion
c) platinum ion
d) lead ion
View Answer
Answer: b
Explanation: It utilizes an impurity in a host material as the active medium. Thus, the neodymium ion (Nd+++) is used as a ‘dopant’, or purposely added impurity in either a glass or YAG crystal and the 1.06 μm output wavelength is dictated by the neodymium ion.

6. The lasing material is a cylinder of a diameter of about _____ mm.
a) 5
b) 9
c) 17
d) 20
View Answer
Answer: b
Explanation: The lasing material or the host is in the form of a cylinder of about 150 mm long and 9 mm in diameter. Both ends of the cylinder are made flat and parallel to each other.

7. The lasing material or crystal is excited by _____
a) neon lamps
b) krypton lamps
c) tungsten wire laps
d) CFLs
View Answer
Answer: b
Explanation: Both ends of the cylinder are made flat and parallel to very close tolerances, then polished to a good optical finish and silvered to make a reflective surface. The crystal is excited by means of an intense krypton or xenon lamps.

8. Which of the following laser is the most efficient?
a) $CO_2$ lasers
b) Nd-YAG lasers
c) Ruby lasers
d) Dye lasers
View Answer
Answer: a
Explanation: The electric discharge style $CO_2$ gas lasers are the most efficient type currently available for high power laser beam material processing. Dye lasers use complex organic dyes like rhodamine 6G.

9. $CO_2$ lasers employs gas mixture of _____
a) nitrogen and helium
b) hydrogen and helium
c) argon and xenon
d) oxygen and nitrogen
View Answer
Answer: a
Explanation: These lasers employ gas mixtures primarily containing nitrogen and helium along with a small percentage of carbon dioxide, and an electric glow discharge is used to pump this laser medium.

10. Gas heating produced by gas lasers is controlled by _____
a) coolant
b) a blow of cool air
c) adjusting the wavelength of the laser
d) circulating the gas mixture
View Answer
Answer: d
Explanation: Gas heating produced by gas lasers is controlled by continuously circulating the gas mixture through the optical cavity area and the thus CO2 lasers are usually categorized according to the type of gas flow in the system.

11. How many categorize are there of $CO_2$ lasers?
a) 2
b) 3
c) 4
d) 5
View Answer

Answer: b
Explanation: $CO_2$ laser are usually categorized according to the type of gas flow in the type of gas flow in the system:
• slow axial
• fast axial
• transverse axial.

12. Slow axial flow gas lasers are simplest of the $CO_2$ lasers.
a) True
b) False
View Answer
Answer: a
Explanation: They are the simplest of the $CO_2$ lasers. Gas flow in the same direction as the laser resonator's optical axis and electric excitation field, or gas discharge path. These lasers are capable of generating laser beams with a continuous power rating.

13. Solid axial flow $CO_2$ lasers can generate laser beams with a constant rating of 80 Watts.
a) True
b) False
View Answer
Answer: a
Explanation: These lasers can generate laser beams with a constant rating of approximately 80 Watts for every meter of discharge length. A folded tube configuration is used for achieving output power levels of 50 to 1000 Watts, maximum

# Laser Beam Machining – 1

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This set of Manufacturing Processes Multiple Choice Questions & Answers (MCQs) focuses on "Laser Beam Machining – 1".

1. Mechanism of material removal in Laser Beam Machining is due to _____
a) mechanical erosion due to impact of high of energy photons
b) electro-chemical etching
c) melting and vaporisation due to thermal effect of impingement of high energy laser beam
d) fatigue failure
View Answer
Answer: c
Explanation: Laser beam machining is carried out utilizing the energy of coherent photons or laser beam, which is mostly converted into thermal energy upon interaction with most of the materials.

2. Laser Beam is produced due to _____
a) spontaneous emission

b) stimulated emission followed by spontaneous emission
c) spontaneous emission followed by Spontaneous absorption
d) spontaneous absorption leading to “population inversion” and followed by stimulated emission
View Answer
Answer: d
Explanation: Lasing process describes the basic operation of laser, i.e. generation of a coherent (both temporal and spatial) beam of light by “light amplification” using “stimulated emission”.

3. Which of the following processes does not use lasers?
a) Cladding
b) Alloying
c) Nitriding
d) Cutting
View Answer
Answer: c
Explanation: Laser Beam Machining or more broadly laser material processing deals with machining and material processing like heat treatment, alloying, cladding, sheet metal bending, etc.

4. Lasers are also used for_____
a) riveting
b) nitriding
c) rapid prototyping
d) facing
View Answer
Answer: c
Explanation: Nowadays, laser is also finding application in regenerative machining or rapid prototyping as in processes like stereo-lithography, selective laser sintering etc.

5. Laser stands for light amplification by stimulated emission of radiation.
a) True
b) False
View Answer
Answer: a
Explanation: Laser stands for light amplification by stimulated emission of radiation. The underline working principle of a laser was

first put forward by Albert Einstein in 1917 through the first industrial laser for experimentation was developed around the 1960s.

6. Laser beams can have power density upto _____
a) 1 $kW/mm^2$
b) 10 $kW/mm^2$
c) 1 $MW/mm^2$
d) 10 $MW/mm^2$
View Answer
Answer: c
Explanation: Laser beam can very easily be focused using optical lenses as their wavelength ranges from half micron to around 70 microns. Focussed laser beam as indicated earlier can have power density in excess of 1 $MW/mm^2$.

7. Laser causes a rapid substantial rise in _____ of the material.
a) local temperature
b) local pressure
c) indentation
d) cracks
View Answer
Answer: a
Explanation: As laser interacts with the material, the energy of the photon is absorbed by the work material leading to rapid substantial rise in local temperature. This in turn results in melting and vaporisation of the work material and finally material removal.

8. At _____ temperature an atom is considered to be at ground level.
a) absolute zero
b) $0^oC$
c) $100^oC$
d) 100 K
View Answer
Answer: a
Explanation: Each of the orbital electrons is associated with unique energy levels. At absolute zero temperature an atom is considered to be at ground level when all the electrons occupy their respective lowest potential energy.

9. The electrons at ground state can be excited to a higher state of energy by _____

a) increasing the pressure
b) lowering the energy
c) absorbing the energy
d) oxidising the atom
View Answer
Answer: c
Explanation: The electrons at ground state can be excited to higher state of energy by absorbing energy form external sources like increase in electronic vibration at elevated temperature, through chemical reaction as well as via absorbing the energy of the photon.

10. The geometry and radii of orbital paths of electrons depend on the presence of an electromagnetic field.
a) True
b) False
View Answer
Answer: a
Explanation: In the model of an atom, negatively charged electrons rotate around the positively charged nucleus in some specified orbital paths. The geometry and radii of such orbital paths depend on a variety of parameters like number of electrons, presence of neighbouring atoms and their electron structure, presence of an electromagnetic field, etc

"Laser Beam Machining-Introduction".

1. What is the full form of LBM in advanced machining processes?
a) Laser Beam Manufacturing
b) Laser Beam Machining
c) Light Blast Manufacturing
d) Light Beam Machining
View Answer
Answer: b
Explanation: The full form of LBM is Laser Beam Machining in the advanced machining processes.

2. LBM offers a good solution for which material properties below?
a) Thermal conductivity
b) Specific heat
c) Boiling temperature
d) All of the mentioned
View Answer
Answer: d
Explanation: LBM offers good solution for material properties such as thermal conductivity, specific heat, melting and boiling temperatures.

3. What is the abbreviation of Laser?
a) Light allowed simple emission of radiation
b) Light amplification by stimulated emission of radiation

c) Light amplified simultaneous emission of rays
d) Light amplified stimulated emanation of rays
View Answer
Answer: b
Explanation: Full form of laser is Light Amplification by Stimulated emission of radiation.

4. Which of the following are the properties of a laser?
a) Highly collimated
b) Monochromatic
c) Coherent light beam
d) All of the mentioned
View Answer
Answer: d
Explanation: Highly collimated, high monochromaticity and the coherence of the light beam are the properties of a laser.

5. Laser beam machining uses which type of power sources for machining?
a) Very low power
b) Low power
c) Medium power
d) High power
View Answer
Answer: d
Explanation: High power densities are used for the generation of laser and for machining in Laser beam machining.

6. Which of the following are different types of lasers used in Laser beam machining?
a) Solid-state ion
b) Neutral gas
c) Semiconductor
d) All of the mentioned
View Answer
Answer: d
Explanation: Laser such as solid-state ion, neutral gas, molecular, semiconductor etc.., can be used in LBM.

7. Which types of lasers are used in Laser beam machining?
a) Continuous wave
b) Pulsed mode
c) Continuous wave & Pulsed mode
d) None of the mentioned
View Answer
Answer: c
Explanation: Laser may be in continuous wave (CW) or in Pulsed mode (PM) for machining in LBM.

8. What is the wavelength value of Ruby laser used in Laser beam machining?
a) 633 nm
b) 694 nm
c) 856 nm
d) 1064 nm
View Answer
Answer: b
Explanation: The value of wave length of Ruby laser used in Laser Beam machining is 694 nm.

9. What is the wavelength value of Nd-YAG and Nd-glass lasers used in LBM?
a) 633 nm
b) 694 nm
c) 856 nm
d) 1064 nm
View Answer

Answer: d
Explanation: The value of wave length of Nd-YAG and Nd-glass lasers used in LBM is 1064 nm.

10. What is the wavelength value of neutral gas laser used in LBM?
a) 633 nm
b) 694 nm
c) 856 nm
d) 1064 nm
View Answer
Answer: a
Explanation: The value of wave length of Neutral gas laser used in Laser beam machining is 633 nm.

11. What is the wavelength value of $CO_2$ laser used in Laser beam machining?
a) 0.16 μm
b) 1.6 μm
c) 10.6 μm
d) 106 μm
View Answer
Answer: c
Explanation: The value of wave length of $CO_2$ laser used in Laser Beam machining is 10.6 μm.

12. What are the values of wavelengths of GaAs laser used in LBM?
a) 100 – 200 nm
b) 200 – 400 nm
c) 600 – 700 nm
d) 800 – 900 nm
View Answer
Answer: d
Explanation: The wavelengths of GaAs laser used in LBM range from 800 – 900 nm.

13. What are the values of wavelengths of Excimer laser used in LBM?
a) 100 – 200 nm
b) 200 – 500 nm
c) 600 – 700 nm
d) 800 – 900 nm
View Answer
Answer: b
Explanation: The wavelengths of Excimer laser used in LBM range from 200 – 500 nm.

14. What are the values of wavelengths of Argon laser used in LBM?
a) 120 – 230 nm
b) 220 – 310 nm
c) 330 – 530 nm
d) 760 – 940 nm
View Answer
Answer: c
Explanation: The wavelengths of Argon laser used in LBM range from 330 – 530 nm

1-Material handling consists of movement of material from

one machine to another
one shop to another shop
stores to shop
all of the above
(Ans: d)

2-Economy in material handling can be achieved by

employing gravity feed movements
minimizing distance of travel
by carrying material to destination without using manual labour
all of the above
(Ans: d)

3-Principle of 'Unit load' states that

materials should be moved in lots
one unit should be moved at a time
both 'a' and 'b'
none of the above
(Ans: a)

4-Fork lift truck is used for

lifting and lowering
vertical transportation
both 'a' and 'b'
none of the above
(Ans: c)

5-Wheel barrows is used for

lifting and lowering
vertical transportation
both 'a' and 'b'
none of the above
(Ans: a)

6- Cranes are used for

lifting and lowering
vertical transportation

both ‘a’ and ‘b’
none of the above
(Ans: c)

7-Match the following

Device Purpose
A. Overhead crane 1. horizontal transportation
B. Pumps 2. lifting and lowering
C. chutes 3. lifting and transportation
The correct order is

A-2, B-1, C-3
A-1, B-2, C-3
A-3, B-2, C-1
A-2, B-3, C-1
(Ans: a)

8-Overbridge crane has

transverse movement
longitudinal movement
both ‘a’ and ‘b’
None of the above
(Ans: c)

9-The following is used to transport materials having flat bottoms

Belt conveyor
Roller conveyor
Chain conveyor
None of the above
(Ans: b)

10-The following is supported from the ceilings

Roller conveyor
Belt conveyor
Chain conveyor
All of the above
(Ans: c)

11-Special purpose material handling equipments are used in

Process layout
Line layout
both ‘a’ and ‘b’
None of the above
(Ans: b)

# Manufacturing science - Mechanical Engineering test questions

**1) Rotary swaging is used for**

a) Manufacturing bolts and rivers
b) Manufacturing seamless tubes
c) Flattening the surface
d) Reducing diameter of round bars and tubes by rotating die which opens and closes rapidly on the work

View Answer / Hide Answer

**ANSWER: d) Reducing diameter of round bars and tubes by rotating die which opens and closes rapidly on the work**

**2) Optimistation is a process of**

a) Maximisation of desirable quantity
b) Minimisation of an undesirable quantity

c) Both (a) and (b)
d) Analysis of an engineering system

View Answer / Hide Answer

**ANSWER: c) Both (a) and (b)**

**3) Linear programming is used in solving optimisation problems that involve**

a) Simplex objective functions
b) Linear objective functions
c) Non-linear objective functions
d) None of these

View Answer / Hide Answer

**ANSWER: b) Linear objective functions**

**4) When is tool life said to be over?**

a) A poor surface is obtained
b) Sudden increase in power and cutting force with chattering takes place
c) If overheating and fuming takes place
d) All of these

View Answer / Hide Answer

**ANSWER: d) All of these**

**5) How can heat generated in metal cutting be determined?**

a) Infra-red technique
b) Using radiation pyrometer
c) Calorimeter set up
d) None of these

View Answer / Hide Answer

**ANSWER: c) Calorimeter set up**

**6) How can the friction between tool and chip be reduced?**

a) Increasing shear angle
b) Increasing sliding velocity
c) Increasing rake angle
d) Using cooling medium

View Answer / Hide Answer

**ANSWER: b) Increasing sliding velocity**

**7) Slurry used in USM is**

a) Water based
b) Alkaline based
c) Alcohol based
d) Mercury based

View Answer / Hide Answer

**ANSWER: a) Water based**

**8) Erosion of metal in EDM is**

a) Continuous
b) Proportionate to the number of sparks
c) Either of these
d) None of these

View Answer / Hide Answer

**ANSWER: b) Proportionate to the number of sparks**

**9) Selection of proper tool material in EDM is influenced by**

a) Surface finish required
b) Volume of material to be removed
c) Tolerance required
d) None of these

View Answer / Hide Answer

**ANSWER: d) None of these**

**10) ……gases are used in Tungsten inert gas welding**

a) Argon and helium
b) Helium and neon
c) Hydrogen and neon
d) Carbon dioxide and hydrogen

View Answer / Hide Answer

**ANSWER: a) Argon and helium**

**11) LASER welding finds widest applications in**

a) Structural work
b) Heavy industry
c) Electronic industry
d) None of these

View Answer / Hide Answer

**ANSWER: c) Electronic industry**

**12) Coining is the operation of**

a) Hot forging
b) Piercing
c) Cold extrusion
d) Cold forging

View Answer / Hide Answer

**ANSWER: d) Cold forging**

**13) What is gear shaping related to?**

a) Forming
b) Hob
c) Generating
d) Template

View Answer / Hide Answer

**ANSWER: b) Hob**

**14) What does a 60 tonnes press implies?**

a) Weight of the press is 60 tonnes
b) It can handle work weighing upto 60 tonnes
c) It can exert pressure upto 60 tonnes
d) None of these

View Answer / Hide Answer

**ANSWER: c) It can exert pressure upto 60 tonnes**

**15) For soft material, the point angle of a drill is**

a) Kept at 112°
b) Decreased
c) Increased
d) Unchanged

View Answer / Hide Answer

**ANSWER: b) Decreased**

**16) Which among the following is an advantage of 'laser beam machining'?**

a) The workpiece is not subjected to large mechanical force
b) There is no contact between tool and workpiece
c) Any material can be welded
d) All the above

View Answer / Hide Answer

**ANSWER: d) All the above**

**17) Why are longitudinal waves preferred in ultrasonic machining?**

a) Are easily generated
b) Can travel at a high velocity
c) Can be propagated in solid, liquid and gases
d) All of these

View Answer / Hide Answer

**ANSWER: d) All of these**

**18) Negative rake is usually provided on**

a) High carbon steel tools
b) HSS tools
c) Cemented carbide tools
d) All of these

View Answer / Hide Answer

**ANSWER: c) Cemented carbide tools**

**19) Chip breakers are provided on the cutting tools**

a) For safety of operators
b) To minimise heat generation
c) To increase tool life
d) To permit short segmented chips

View Answer / Hide Answer

**ANSWER: d) To permit short segmented chips**

**20) In reverse polarity welding**

a) Electrode holder is connected to positive and work to negative
b) Work is negative and holder is earthed
c) Electrode holder is connected to negative and works to positive
d) Any of these

View Answer / Hide Answer

**ANSWER: a) Electrode holder is connected to positive and work to negative**

**21) The strength of a cutting tool depend on**

a) Clearance angle
b) Rake angle
c) Lip angle
d) All of these

View Answer / Hide Answer

**ANSWER: b) Rake angle**

**22) The purpose of side rake is**

a) To control chip flow
b) To shear of the metal
c) To break chips
d) None of these

View Answer / Hide Answer

**ANSWER: a) To control chip flow**

**23) Undercutting is the operation of cutting**

a) With a depth of cut
b) A deep groove
c) Below the specified size
d) A groove next to shoulder

View Answer / Hide Answer

**ANSWER: d) A groove next to shoulder**

**24) The function of a swab is**

a) To shake pattern to facilitate its withdrawal from the mould
b) To repair and finish the mould

c) To apply water to the mould around the edge of the pattern
d) All of these

View Answer / Hide Answer

**ANSWER: c) To apply water to the mould around the edge of the pattern**

**25) Refractories should have the following properties except**

a) High electrical conductivity
b) Long life
c) Minimum contraction and expansion due to temperature variation
d) Heat insulation

View Answer / Hide Answer

**ANSWER: a) High electrical conductivity**

**26) Padding is**

a) An extra support for thin castings
b) An extra metal welded to the original uniform section of the casting
c) A method for production of chilled castings
d) None of these

View Answer / Hide Answer

**ANSWER: b) An extra metal welded to the original uniform section of the casting**

**27) Skeleton patterns are used for**

a) Small castings
b) Large castings
c) Hollow castings
d) Non-ferrous castings

View Answer / Hide Answer

**ANSWER: b) Large castings**

**28) Design of gate should be such as to**

a) Avoid crosion of cores and mould cavity
b) Minimize turbulence and dross formation
c) Prevent scum, slag or eroded sand particles from entering the mould cavity
d) All of these

View Answer / Hide Answer

**ANSWER: d) All of these**

**29) Jigs and fixtures are used to**

a) Remove the chips.
b) Reduce cost of manufacture
c) Facilitate interchange ability, increasing productivity and accuracy
d) Increase productivity and allow rest time to operator

View Answer / Hide Answer

**ANSWER: c) Facilitate interchange ability, increasing productivity and accuracy**

**30) Tool signature is**

a) It is a numerical method of tool identification
b) It outlines the orthographic projection of tool
c) It is pictorial view of the tool
d) It represents complete specification of he tool

View Answer / Hide Answer

**ANSWER: a) It is a numerical method of tool identification**

# Optical Sources : Laser Basics

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This set of Optical Communications Multiple Choice Questions & Answers (MCQs) focuses on "Optical Sources : Laser Basics".

1. A device which converts electrical energy in the form of a current into optical energy is called as _____
a) Optical source
b) Optical coupler
c) Optical isolator
d) Circulator
View Answer
Answer: a
Explanation: An Optical source is an active component in an optical fiber communication system. It converts electrical energy into optical energy and allows the light output to be efficiently coupled into the Optical fiber.

2. How many types of sources of optical light are available?
a) One
b) Two
c) Three
d) Four
View Answer
Answer: c
Explanation: Three main types of optical light sources are available. These are wideband sources, monochromatic incoherent sources. Ideally the optical source should be linear.

3. The frequency of the absorbed or emitted radiation is related to difference in energy E between the higher energy state $E_2$ and the lower energy state $E_1$. State what h stands for in the given equation?
$E = E_2 - E_1 = hf$
a) Gravitation constant
b) Planck's constant
c) Permittivity
d) Attenuation constant
View Answer
Answer: b
Explanation: In the given equation, difference in the energy E is directly proportional to the absorbed frequency (f) where h is used as a constant and is called as Planck's constant. The value of h is measured in Joules/sec & is given by-
$h = 6.626 \times 10^{-34}$Js.

4. The radiation emission process (emission of a proton at frequency) can occur in _____ ways.
a) Two
b) Three
c) Four
d) One
View Answer
Answer: a
Explanation: The emission process can occur in two ways. First is by spontaneous emission in which the atom returns to the lower energy state in a random manner. Second is by stimulated emission where the energy of a photon is equal to the energy difference and it interacts with the atom in the upper state causing it to return to the lower state along with the creation of a new photon.

5. Which process gives the laser its special properties as an optical source?
a) Dispersion
b) Stimulated absorption
c) Spontaneous emission
d) Stimulated emission
View Answer
Answer: d
Explanation: In Stimulated emission, the photon produced is of the same energy to the one which cause it. Hence, the light associated with stimulated photon is in phase and has same polarization. Therefore, in contrast to spontaneous emission, coherent radiation is obtained. The coherent radiation phenomenon in laser provides amplification thereby making laser a better optical source than LED.

6. An incandescent lamp is operating at a temperature of 1000K at an operating frequency of $5.2\times10^{14}$ Hz. Calculate the ratio of stimulated emission rate to spontaneous emission rate.
a) $3\times10^{-13}$
b) $1.47\times10^{-11}$
c) $2\times10^{-12}$
d) $1.5\times10^{-13}$
View Answer
Answer: b
Explanation: The ratio of the stimulated emission rate to the spontaneous emission rate is given by-
Stimulated emission rate/ Spontaneous emission rate = 1/exp (hf/KT)-1.

7. The lower energy level contains more atoms than upper level under the conditions of _____
a) Isothermal packaging
b) Population inversion
c) Thermal equilibrium
d) Pumping
View Answer
Answer: c
Explanation: Under the conditions of thermal equilibrium, the lower energy level contains more atoms than the upper level. To achieve optical amplification, it is required to create a non-equilibrium distribution such that the population of upper energy level is more than the lower energy level. This process of excitation of atoms into the upper level is achieved by using an external energy source and is called as pumping.

8. _____ in the laser occurs when photon colliding with an excited atom causes the stimulated emission of a second photon.
a) Light amplification
b) Attenuation
c) Dispersion
d) Population inversion
View Answer
Answer: a
Explanation: Laser emits coherent radiation of one or more discrete wavelength. Lasers produce coherent light through a process called stimulated emission. Light amplification is obtained through stimulated emission. Continuation of this process creates avalanche multiplication.

9. A ruby laser has a crystal of length 3 cm with a refractive index of 1.60, wavelength 0.43 μm. Determine the number of longitudinal modes.
a) $1\times10^{2}$
b) $3\times10^{6}$
c) $2.9\times10^{5}$
d) $2.2\times10^{5}$
View Answer
Answer: d
Explanation: The number of longitudinal modes is given by-
$q = 2nL/\lambda$
Where
q = Number of longitudinal modes

n = Refractive index
L = Length of the crystal
λ = Peak emission wavelength.

10. A semiconductor laser crystal of length 5 cm, refractive index 1.8 is used as an optical source. Determine the frequency separation of the modes.
a) 2.8 GHz
b) 1.2 GHz
c) 1.6 GHz
d) 2 GHz
View Answer
Answer: c
Explanation: The modes of laser are separated by a frequency internal δf and this separation is given by-
$\delta f = c/2nL$
Where
c = velocity of light
n = Refractive index
L = Length of the crystal.

11. Doppler broadening is a homogeneous broadening mechanism.
a) True
b) False
View Answer
Answer: b
Explanation: Doppler broadening is a inhomogeneous broadening mechanism. In this broadening, the individual groups of atoms have different apparent resonance frequencies. Atomic collisions usually provide homogeneous broadening as each atom in collection has same resonant frequency and spectral spread.

12. An injection laser has active cavity losses of 25 $cm^{-1}$ and the reflectivity of each laser facet is 30%. Determine the laser gain coefficient for the cavity it has a length of 500μm.
a) 46 $cm^{-1}$
b) 51 $cm^{-1}$
c) 50 $cm^{-1}$
d) 49.07 $cm^{-1}$
View Answer
Answer: d
Explanation: The laser gain coefficient is equivalent to the threshold gain per unit length and is given by –
$g_{th} = \alpha + 1/L \ln (1/r)$
Where
α = active cavity loss
L = Length of the cavity
r = reflectivity.

13. Longitudinal modes contribute only a single spot of light to the laser output.
a) True
b) False
View Answer
Answer: a
Explanation: Laser emission includes the longitudinal modes and transverse modes. Transverse modes give rise to a pattern of spots at the output. Longitudinal modes give only a spot of light to the output.

14. Considering the values given below, calculate the mode separation in terms of free space wavelength for a laser. (Frequency separation = 2GHz, Wavelength = 0.5 μm)
a) $1.4\times10^{-11}$
b) $1.6\times10^{-12}$
c) $1\times10^{-12}$

d) $6\times10^{-11}$
View Answer
Answer: b
Explanation: The mode separation in terms of free space wavelength is given by-
$\delta\lambda = \lambda^2/c\ \delta f$
Where
$\delta f$ = frequency separation
$\lambda$ = wavelength
c = velocity of light

# HoloGraphy

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This set of Engineering Physics Multiple Choice Questions & Answers (MCQs) focuses on "HoloGraphy".

1. In holographic data storage, the information is stored in _____
a) Pendrives
b) Cells
c) Crystals
d) Diode
View Answer
Answer: c
Explanation: Holography is used in holographic data storage. In this method, all the data is stored in crystals or photopolymers. It is mostly used in electronic data storage devices.

2. The technique by which image is obtained from a hologram is called as _____
a) Formation
b) Construction
c) Reconstruction
d) Projection
View Answer
Answer: c
Explanation: The process of generation of an image from a hologram is called reconstruction. In the process, a wave called reconstruction wave illuminates the hologram, thus giving rise to the desired image.

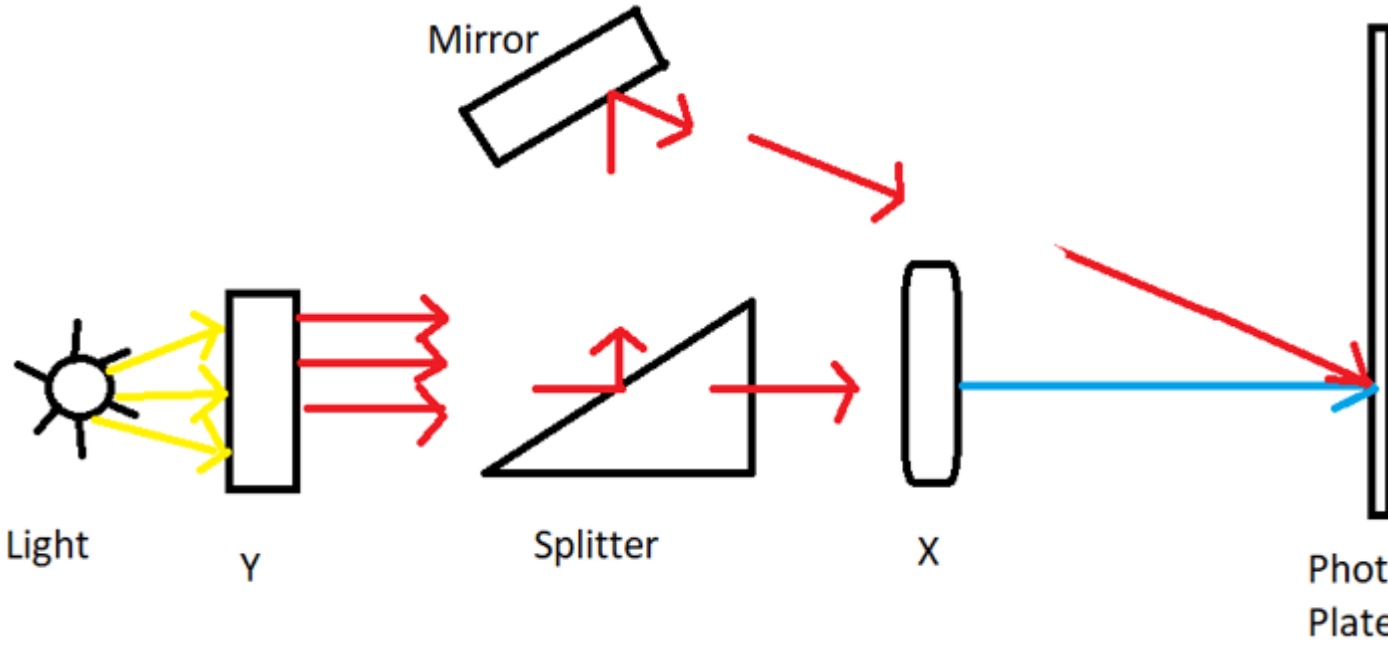
3. Which of the following is used for the formation of holograms?
a) X-ray
b) Visible Light
c) Infrared
d) Lasers
View Answer
Answer: d
Explanation: Laser is highly coherent. Due to this, they are widely used in the reconstruction process. In a hologram, each point contains light from the whole of the original scene.

4. It is not possible to break a hologram in small pieces.
a) True
b) False
View Answer
Answer: b
Explanation: Holograms can be broken into smaller pieces and they can be reconstructed to form the entire object. However, the size of the hologram is reduced, as the resolution decreases. The image starts to get blurred.

5. The information in the hologram exists in _____
a) Colored Image form
b) Black and white image form

c) 3-D image form
d) Coded form
View Answer
Answer: d
Explanation: All the information in a processed photographic plate, called hologram, exists in coded form. Information about the phase and the amplitude of the object wave is stored.

6. Identify X and Y.




a) X: Crystal, Y: Object
b) X: Object, Y: Crystal
c) X: Object, Y: Glass Slab
d) X: Glass Slab, Y: Object
View Answer
Answer: b
Explanation: In the figure, Y is the crystal and X is the object. This is the technique by which a hologram is created on the photographic plate. The process photographic plate contains information about the phase as well as the amplitude of the object wave.

7. Holography is based on the principle of _____
a) Interference
b) Diffraction
c) Interferometer
d) Polarization
View Answer
Answer: a
Explanation: The principle of interference is used in Holography. The interference pattern between two or more beams of coherent light or laser is captured by a hologram. The hologram captures light as it interests the whole area of the film.

8. When viewing a hologram print, the image changes as you move around.
a) True
b) False
View Answer
Answer: a
Explanation: As we know, a hologram contains light from the whole original scene. It records the scene through an area of perspective. Thus, as you move around, the image changes according to your position as well.

9. The principle of generation of the wavefront from an object from a hologram can be used for _____
a) Data Storage
b) Transient Microscopy
c) Interferometry
d) Pattern recognition
View Answer
Answer: d
Explanation: Holography can be used to identify fingerprints, postal addresses, etc. The wavefront from an object is generated from a hologram. The process is reversible and reference wave can be generated by object wave, which is the basis of character recognition.

10. The holograms found on credit-cards are an example of _____
a) Volume Holograms
b) Rainbow Holograms
c) Reflection Hologram
d) Hybrid hologram
View Answer
Answer: b
Explanation: Rainbow Hologram begins with a standard transmission hologram. These types of holograms are found on credit cards. They are designed to be viewed under white light illumination

## “Destructive and Non-Destructive Tests”

1. Which among the following is not a type of Non-destructive testing?
a) Compression test
b) Visual testing
c) Ultrasonic testing
d) Eddy current testing
View Answer
Answer: a
Explanation: Compression test is a type of destructive testing. This test is used to determine behavior of metals under compressive load. Visual testing, ultrasonic testing, eddy current testing are types of non-destructive testing.

2. Identify the type of destructive testing _____
a) Radiographic test
b) Dye penetrant test
c) Creep test
d) Visual testing
View Answer
Answer: c
Explanation: Creep test is a type of destructive test. It is defined as slow plastic deformation at high temperatures for a longer time under constant stresses. Creep occurs at room temperature and at high temperatures.

3. Which among the following is the last step in magnetic particle test method?
a) Observation and inspection
b) Circular magnetization
c) Demagnetization
d) Magnetization
View Answer
Answer: c
Explanation: Different steps involved in magnetic particle test are cleaning the surface, magnetizing the metallic component, application of ferromagnetic powder, observation and inspection and demagnetization.

4. Which of the following statements is/are true for the ultrasonic test?
a) Equipment used for ultrasonic testing is portable
b) Complicated shapes can be easily scanned
c) Waves generated are health hazardous
d) Waves generated are health hazardous and complicated shapes can be easily scanned
View Answer
Answer: a
Explanation: Ultrasonic test uses sound waves of high frequency to detect discontinuities. This method is used to detect flaws on the surface and also deep inside the component. The waves travel in straight line and are reflected from metal gas interface or discontinuities in their patch.

5. Which test can be performed without skilled labour?
a) Probe test
b) Bend liquid test
c) Dye penetrant test
d) Torsion test
View Answer
Answer: c
Explanation: Dye penetrant test does not require any skilled labour. This method only detects surface discontinuities and this test needs to be observed with naked eyes or with a low magnifying glass.

6. What is nondestructive test?
a) Nondestructive tests are applications for detecting flaws in

materials without impairing their usefulness
b) Nondestructive tests are applications for detecting flaws that impair the use of the materials such as pressure testing
c) Nondestructive tests are applications for detecting flaws in materials with impairing their usefulness
d) Nondestructive tests are applications for detecting flaws that do not impair the use of the materials such as pressure testing
View Answer
Answer: a
Explanation: Nondestructive tests are applications for detecting flaws in materials without impairing their usefulness.

7. What is a destructive test?
a) Destructive tests are applications for detecting flaws in materials without impairing their usefulness
b) Destructive tests are applications for detecting flaws that impair the use of the materials such as pressure testing
c) Destructive tests are applications for detecting flaws in materials with impairing their usefulness
d) Destructive tests are applications for detecting flaws that do not impair the use of the materials such as pressure testing
View Answer
Answer: b
Explanation: Destructive tests are applications for detecting flaws that impair the use of materials such as pressure testing

“Laser”.

1. Which of the following is a unique property of laser?
a) Directional
b) Speed
c) Coherence
d) Wavelength
View Answer
Answer: c
Explanation: Coherence is an important characteristic of laser beam because in laser beams, the wave trains of the same frequency are in phase/ Due to high coherence it results in extremely high power.

2. Which of the following is an example of optical pumping?
a) Ruby laser

b) Helium-Neon laser
c) Semiconductor laser
d) Dye laser
View Answer
Answer: a
Explanation: The atoms of Ruby are excited with the help of photons emitted by an external optical source. The atoms absorb energy from photos and raises to excited state. Therefore Ruby laser is an example of optical pumping.

3. When laser light is focussed on a particular area for a long time, then that particular area alone will be heated.
a) True
b) False
View Answer
Answer: a
Explanation: Laser beam has very high intensity, directional properties and coherence. When it is focussed on a particular area for a long time, then the area alone will be heated and the other area will remain as such. This is called thermal effect.

4. Calculate the wavelength of radiation emitted by an LED made up of a semiconducting material with band gap energy 2.8eV.
a) 2.8 Å
b) 4.3308 Å
c) 5548.4 Å
d) 4430.8 Å
View Answer
Answer: d
Explanation: E = hc/ʎ
Therefore, ʎ = hc/E
ʎ = 4430.8 Å.

5. Calculate the number of photons, from green light of mercury (ʎ = 4961 Å), required to do one joule of work.
a) $4524.2\times10^{18}/m^3$
b) $2.4961\times10^{18}/m^3$
c) $2.4961/m^3$
d) 2.4961/m
View Answer

Answer: b
Explanation: E = hc/ʎ
E = $4.006 \times 10^{-19}$ Joules
Number of photons required = (1 Joule)/($4.006 \times 10^{-19}$)
N = $2.4961 \times 10^{18}/m^3$.

6. Which of the following can be used for the generation of laser pulse?
a) Ruby laser
b) Carbon dioxide laser
c) Helium neon laser
d) Nd- YAG laser
View Answer
Answer: d
Explanation: Since Nd YAG laser has a higher thermal conductivity than other solid state lasers, it lends itself for the generation of laser pulses at a higher pulse repetition rate or a quasi continuous wave operation.

7. What is the need to achieve population inversion?
a) To excite most of the atoms
b) To bring most of the atoms to ground state
c) To achieve stable condition
d) To reduce the time of production of laser
View Answer
Answer: a
Explanation: When population inversion is achieved, the majority of atoms are in the excited state. This causes amplification of the incident beam by stimulated emission. Thus the laser beam is produced.

8. Laser is called as a non-material knife.
a) False
b) True
View Answer
Answer: b
Explanation: In laser surgery, without knife, bloodless operation, cutting tissues etc can be made, hence laser is called non-material knife.

9. DVD uses the laser.
a) True

b) False
View Answer
Answer: a
Explanation: A DVD player contains a laser. By moving the lens longitudinally, different depths can be reached in the disc. In order to make room for a lot of information on every disc, the beam has to be focused on as small an area as possible. This cannot be done with any other light source.

10. Which of the following is used in atomic clocks?
a) Laser
b) Quartz
c) Maser
d) Helium
View Answer
Answer: c
Explanation: Before laser maser was used. It stood for microwave amplification by stimulated emission of radiation. This was based on Albert Einstein's principle of stimulated emission. It was used in the atomic clock.

11. Which of the following can be used in the vibrational analysis of structure?
a) Maser
b) Quarts
c) Electrical waves
d) Laser
View Answer
Answer: d
Explanation: Laser can be used in the vibrational analysis of the structure. This is because when a structure under test begins to vibrate a distinctive pattern begins to emerge

laser, ruby laser and helium neon laser

I. What is the pumping source in Ruby laser?

Electrical Pumping

Optical

Chemical

None of the above
II. What is the output in wavelength of ruby laser?

6943 angstroms
6328 angstroms
5400 angstroms
8000 angstroms
III. Is Ruby laser a gas laser?

True
false
IV. What is the pumping source in Helium – Neon laser?

Electrical Pumping
Optical
Chemical
None of the above
V. What is the output in wavelength of Helium-Neon laser?

6943 angstroms
6328 angstroms
5400 angstroms
8000 angstroms
VI. Ruby laser is a _____ level laser.

Three
Four
Five
Two
VII. Helium-Neon laser is a _____ level laser.

Three
Four

Five
Two
VIII. In LASER, S stands for:

Spontaneous
Stimulated
Simultaneously
None of the above
IX. Laser medium in Ruby laser is:

Aluminium oxide
Chromium oxide
Chromium oxide doped with aluminium ions
Aluminium oxide doped with chromium ions
X. Which laser has continuous output?

Ruby laser
Helium-Neon laser
Both
None of the above
Answers: I. (2), II (1), III(2), IV(1), V(2), VI(1), VII (2), VIII (2), IX (4), X(2)

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

## EE 8551 – Microprocessor & Microcontroller
## Regulation 2017, Odd Semester
## Multiple Choice Questions

1 Kilo bits are equal to

- 1000 bits
- 1024 bits
- 1012 bits
- 1008 bits

A Nibble is equal to _____ bit(s)

- 1
- 2
- 4
- 8

Transfer of data from one register to another register is known as _____ register operation.

- Inter
- Intra
- Inside
- In between

8085 microprocessor is an 8-bit microprocessor designed by?

A. IBM
B. Dell
C. Intel
D. VAX

In 8085, 16-bit address bus, which can address upto?

A. 16KB
B. 32KB
C. 64KB
D. 128KB

There are _____ general purpose registers in 8085 processor

A. 5
B. 6
C. 7
D. 8

It is also a 16-bit register works like stack, which is always incremented/decremented by 2 during push & pop operations.

A. Stack pointer
B. Temporary register
C. Flag register
D. Program counter

Flag register is an 8-bit register having _____ 1-bit flip-flops.

A. 3
B. 4
C. 5
D. 6

What is true about Program counter?

A. It is an 8-bit register, which holds the temporary data of arithmetic and logical operations.
B. When an instruction is fetched from memory then it is stored in the program counter
C. It provides timing and control signal to the microprocessor
D. It is a 16-bit register used to store the memory address location of the next instruction to be executed.

This signal indicates that another master is requesting the use of the address and data buses.

A. READY
B. HOLD
C. HLDA
D. INTA

This signal is used as the system clock for devices connected with the microprocessor.

A. X1, X2
B. CLK OUT
C. CLK IN
D. IO/M

Which of the following is true about Control and status signals?

A. These signals are used to identify the nature of operation.
B. There are 3 control signal and 3 status signals.
C. Three status signals are IO/M, S0 & S1.
D. All of the above

How many types of Interfacing?

A. 2
B. 3
C. 4
D. 5

In which type of communication, the interface gets a single byte of data from the microprocessor and sends it bit by bit to the other system serially and vice-a-versa?

A. Parallel Communication Interface
B. Serial Communication Interface
C. Both A and B
D. None of the above

3. Which of the following are known as Higher Address Bus?

A. A15 - A8
B. AD7 - AD0
C. READY
D. WR

View Answer

Ans : A

Explanation: A15 - A8 (Higher Address Bus)

## 4. In which mode, the CPU periodically reads an internal flag of 8279 to check whether any key is pressed or not with key pressure?

A. Interrupt mode
B. Polled mode
C. Decoded Mode
D. Encoded Mode

View Answer

Ans : B

Explanation: In the Polled mode, the CPU periodically reads an internal flag of 8279 to check whether any key is pressed or not with key pressure.

## 5. What is true about Encoded Mode?

A. the unit contains registers to store the keyboard, display modes
B. the counter internally decodes the least significant 2 bits and provides a decoded 1 out of 4 scan on SL0-SL3.
C. the processor is requested service only if any key is pressed, otherwise the CPU will continue with its main task.
D. the counter provides the binary count that is to be externally decoded to provide the scan lines for the keyboard and display.

View Answer

Ans : D

Explanation: In the encoded mode, the counter provides the binary count that is to be externally decoded to provide the scan lines for the keyboard and display.

## 6. Which pin is used to blank the display during digit switching?

A. WR
B. IR
C. BD
D. DB

View Answer

Ans : C

Explanation: BD : It stands for blank display. It is used to blank the display during digit switching.

## 10. MVI K, 20F is an example of?

A. Immediate addressing mode
B. Register addressing mode
C. Direct addressing mode
D. Indirect addressing mode

View Answer

Ans : A

Explanation: Immediate addressing mode : In this mode, the 8/16-bit data is specified in the instruction itself as one of its operand. For example: MVI K, 20F: means 20F is copied into register K.

## 7. Which mode allows 8/16 character multiplexed displays to be organized as dual 4-bit/single 8-bit display units?

A. Display Entry
B. Display Scan
C. Strobed Input
D. Scanned Keyboard Mode

View Answer

Ans : B

Explanation: Display Scan : This mode allows 8/16 character multiplexed displays to be organized as dual 4-bit/single 8-bit display units.

## 8. DMA stands for?

A. Display Memory Access
B. Directly Memory Access
C. Device Memory Access
D. Direct Memory Access

View Answer

Ans : D

Explanation: DMA stands for Direct Memory Access

## 9. Which of the following is not true features of 8257?

A. It has three channels which can be used over three I/O devices.
B. Each channel has 16-bit address and 14-bit counter.
C. Each channel can transfer data up to 64kb.
D. Each channel can be programmed independently.

View Answer
Ans : A

Explanation: It has four channels which can be used over four I/O devices is true.

## 10. What is correct range of frequency for 8257?

A. 500Hz to 3MHz.
B. 250Hz to 2MHz.
C. 250Hz to 3MHz.
D. 500Hz to 2MHz.

View Answer
Ans : C

Explanation: Its frequency ranges from 250Hz to 3MHz.

## 1. What is true about microcontroller?

A. A microcontroller is a small and low-cost microcomputer
B. It is designed to perform the specific tasks of embedded systems
C. microcontroller consists of the processor, the memory, Serial ports, peripherals.
D. All of the above

View Answer
Ans : D

Explanation: All of the above statement are true.

## 2. Which is false about microcontroller?

A. Microcontrollers are used to execute a single task within an application.
B. It consists of CPU, RAM, ROM, I/O ports.
C. Its power consumption is high because it has to control the entire system.
D. It is built with CMOS technology

View Answer
Ans : C

Explanation: It is built with CMOS technology, which requires less power to operate.

## 3. This type of microcontroller is generally used in automatically controlled appliances like automatic operational machines.

A. 8-bit microcontroller
B. 16-bit microcontroller

C. 32-bit microcontroller
D. 64-bit microcontroller

View Answer

Ans : C

Explanation: 32-bit microcontroller : This type of microcontroller is generally used in automatically controlled appliances like automatic operational machines.

## 4. This type of microcontroller is designed in such a way that they do not have a program memory on the chip.

A. External memory microcontroller
B. Embedded memory microcontroller
C. CISC
D. RISC

View Answer

Ans : A

Explanation: External memory microcontroller : This type of microcontroller is designed in such a way that they do not have a program memory on the chip. Hence, it is named as external memory microcontroller.

## 5. Which of the following is an example of Embedded memory microcontroller?

A. Intel 8031 microcontroller
B. Intel 8051 microcontroller.
C. Intel 8081 microcontroller.
D. Intel 8085 microcontroller.

View Answer

Ans : B

Explanation: Intel 8051 microcontroller is an example of Embedded memory microcontroller.

## 6. 8051 microcontroller is designed by Intel in?

A. 1980
B. 1981
C. 1982
D. 1983

View Answer

Ans : B

Explanation: 8051 microcontroller is designed by Intel in 1981. It is an 8-bit microcontroller

## 7. At what PIN number, there is a RESET pin, which is used to reset the microcontroller to its initial values?

A. PIN 9
B. PIN 20
C. PIN 30
D. PIN 35

View Answer

Ans : A

Explanation: Pin 9 : It is a RESET pin, which is used to reset the microcontroller to its initial values.

## 8. At what PIN number, there is EA pin which stands for External Access input?

A. PIN 28
B. PIN 29
C. PIN 30
D. PIN 31

View Answer

Ans : C

Explanation: Pin 30 : This is EA pin which stands for External Access input. It is used to enable/disable the external memory interfacing.

## 9. When pins are configured as an output (i.e. logic 0), then the single port pins can receive a current of?

A. 5mA
B. 8mA
C. 15mA
D. 10mA

View Answer

Ans : D

Explanation: When pins are configured as an output (i.e. logic 0), then the single port pins can receive a current of 10mA.

10. Which IO Port can be used for higher address byte with addresses A8-A15?

A. PORT1
B. PORT0
C. PORT3
D. PORT2

View Answer

Ans : D

Explanation: PORT2 : This port can be used for higher address byte with addresses A8-A15. When no memory is added then this port can be used as a general input/output port similar to Port 1.

1. The _____ is a general purpose programmable I/O device designed to transfer the data from I/O to interrupt I/O.

A. 8285A
B. 8241A
C. 8255A
D. 8251A

View Answer

Ans : C

Explanation: The 8255A is a general purpose programmable I/O device designed to transfer the data from I/O to interrupt I/O

2. How many ports 8255A has?

A. 2
B. 3
C. 4
D. 5

View Answer

Ans : B

Explanation: 8255A has three ports, i.e., PORT A, PORT B, and PORT C.

3. Which port can be split into two parts?

A. PORT A
B. PORT B
C. PORT C
D. PORT D

View Answer
Ans : C

Explanation: Port C can be split into two parts, i.e. PORT C lower (PC0-PC3) and PORT C upper (PC7-PC4) by the control word.

## 4. Which of the following are Features of 8255A?

A. It consists of 3 8-bit IO ports i.e. PA, PB, and PC.
B. Address/data bus must be externally demux'd.
C. It is TTL compatible.
D. All of the above

View Answer
Ans : D

Explanation: All of the above are Features of 8255A.

## 5. Which of the following is responsible for controlling the internal/external transfer of data/control/status word?

A. Data Bus Buffer
B. Read/Write Control Logic
C. CS
D. WR

View Answer
Ans : B

Explanation: Read/Write Control Logic : This block is responsible for controlling the internal/external transfer of data/control/status word.

## 6. Which of the following uses N-MOS technology?

A. 8253
B. 8254
C. 8255
D. 8256

View Answer
Ans : A

Explanation: 8253 : It uses N-MOS technology.

7. It is a tri-state, bi-directional, 8-bit buffer, which is used to interface the 8253/54 to the system data bus.

A. Read/Write Logic
B. Data Bus Buffer
C. system data bus
D. System Buffer

View Answer

Ans : B

Explanation: Data Bus Buffer : It is a tri-state, bi-directional, 8-bit buffer, which is used to interface the 8253/54 to the system data bus.

8. 8253/54 can be operated in _____ Modes?

A. 3
B. 4
C. 5
D. 6

View Answer

Ans : D

Explanation: 8253/54 can be operated in 6 different modes

9. Which mode can be used as a mono stable multi-vibrator?

A. Mode 0
B. Mode 1
C. Mode 2
D. Mode 3

View Answer

Ans : B

Explanation: Mode 1 : Programmable One Shot can be used as a mono stable multi-vibrator.

10. Which mode generates a strobe in response to an externally generated signal?

A. Mode 3
B. Mode 4
C. Mode 5
D. Mode 6

View Answer
Ans : C

Explanation: Mode 5 : Hardware Triggered Mode generates a strobe in response to an externally generated signal.

### 1. A machine language instruction format consists of -

- Operation code field
- Operation code field & operand field
- Operand field
- none of the mentioned

View Answer
**A machine language instruction format consists of Operation code field & operand field.**

### 2. The instruction, MOV AX, 1234H is an example of -

- register addressing mode
- immediate addressing mode
- based indexed addressing mode
- direct addressing mode

View Answer

**The instruction, MOV AX, 1234H is an example of immediate addressing mode.**

### 3. The full form of FPGA is -

- Forward Programmable Gate Array
- Forward Parallel Gate Array
- Field Programmable Gate Array
- Field Parallel Gate Array

View Answer

**The full form of FPGA is Field Programmable Gate Array**

### 4. Which language could be used for programming an FPGA.

- VHDL
- Verilog
- Both A and B
- None

View Answer

**Both A and B**

### 5. 8085 microprocessor has how many pins -

- 41.
- 39.
- 40.
- 30.

View Answer

**8085 microprocessor has 40 pins .**

### 6. What is SIM?

- Set interrupt mask.
- Sorting interrupt mask.
- Select interrupt mask.
- None of these

View Answer

**SIM stands for Set interrupt mask.**

### 7. The ROM programmed during manufacturing process itself is called -

- EPROM

- PROM
- EEPROM
- MROM

View Answer

**The ROM programmed during manufacturing process itself is called MROM**

### 8. The ROM programmed during manufacturing process itself is called -

- EPROM
- PROM
- EEPROM
- MROM

View Answer

**The ROM programmed during manufacturing process itself is called MROM**

### 9. Output of the assembler in machine codes is referred to as -

- Source program
- Macroinstruction
- Object program
- Symbolic addressing

View Answer

**Output of the assembler in machine codes is referred to as Object program.**

### 10. The software used to drive microprocessor-based systems is called-

- firmware
- machine language code
- BASIC interpreter instructions
- assembly language

View Answer

**The software used to drive microprocessor-based systems is called assembly language**

### 11. How many buses are connected as part of the 8085A microprocessor?

- 8
- 5
- 3
- 2

View Answer

**3 buses are connected as part of the 8085A microprocessor.**

### 12. The items that you can physically touch in a computer system are called:-

- firmware
- hardware
- software
- none of the above

View Answer

**The items that you can physically touch in a computer system are called hardware.**

### 13. ALU (Arithmetic and Logic Unit ) of 8085 microprocessor consists of-

- Accumulator, arithmetic, logic circuits and five flags
- Accumulator, arithmetic and logic circuits
- Accumulator, temporary register, arithmetic, logic circuits and five flags
- Accumulator, temporary register, arithmetic and logic circuits

View Answer

**ALU (Arithmetic and Logic Unit ) of 8085 microprocessor consists of Accumulator, temporary register, arithmetic, logic circuits and five flags.**

### 14. Register pair used to indicate memory-

- B and C
- D and E
- H and L
- W and Z

View Answer

**Register pair used to indicate memory H and L.**

**15. The Intel 8086 microprocessor is a _____ processor.**

- 16 bit
- 32 bit
- 8 bit
- 4 bit

View Answer

**The Intel 8086 microprocessor is a 16 bit processor.**

**16. In which year, 8086 microprocessor was introduced?**

- 1978
- 1979
- 1977
- 1981

View Answer

**In 1978 8086 microprocessor was introduced .**

**17. In 8086, Example for Non maskable interrupts are _____.**

- rst6.5
- intr
- rst6.6
- trap

View Answer

**In 8086, Example for Non maskable interrupts are trap.**

### 18. RIM is used to check whether, _____

- The interrupt is Masked or not
- The write operation is done or not
- both 1 & 2
- None of these

View Answer

**RIM is used to check whether the interrupt is Masked or not.**

### 19. The first digital computer build with IC chips was known as -

- Apple -1
- IBM 7090
- IBM system / 360
- VAX - 10

View Answer

**The first digital computer build with IC chips was known as IBM system / 360.**

### 20. Which of the following is used for manufacturing chips?

- Control bus
- Control unit
- Parity unit
- Semiconductor

View Answer

**Semiconductor is used for manufacturing chips.**

### 21. Which of following instruction subtract memory and carry from a,b

- AB[a,x,y]

- SBC[a,b]
- SUB[a,b,d]
- tst[a,b]

View Answer

**SBC[a,b] instruction subtract memory and carry from a,b.**

### 22. Which of following load the stack pointer

- bgt
- LDS
- bhs
- RTS

View Answer

**LDS load the stack pointer**

1. In the I/O mode, the 8255 ports work as
a) reset pins
b) set pins
c) programmable I/O ports
d) only output ports
View Answer
Answer: c
Explanation: In the I/O mode, the 8255 ports work as programmable I/O ports.

2. In BSR mode, only port C can be used to
a) set individual ports
b) reset individual ports
c) set and reset individual ports
d) programmable I/O ports
View Answer
Answer: c
Explanation: In BSR (Bit Set-Reset) Mode, port C can be used to set and reset its individual port bits.

3. The feature of mode 0 is
a) any port can be used as input or output
b) output ports are latched
c) maximum of 4 ports are available
d) all of the mentioned
View Answer
Answer: d
Explanation: In mode 0, any port can be used as input or output and output ports are latched.

4. The strobed input/output mode is another name of
a) mode 0
b) mode 1
c) mode 2
d) none
View Answer
Answer: b
Explanation: In this mode, the handshaking signals control the input or output action of the specified port.

5. If the value of the pin STB (Strobe Input) falls to low level, then
a) input port is loaded into input latches
b) input port is loaded into output latches
c) output port is loaded into input latches
d) output port is loaded into output latches
View Answer
Answer: a
Explanation: If the value of the pin STB (Strobe Input) falls to low level, the input port is loaded into input latches.

6. The signal, SLCT in the direction of signal flow, OUT, indicates the selection of
a) Control word register
b) CPU
c) Printer
d) Ports
View Answer
Answer: c
Explanation: This signal indicates that the printer is selected.

7. The pulse width of the signal INIT at the receiving terminal must be more than
a) 10 microseconds
b) 20 microseconds
c) 40 microseconds
d) 50 microseconds
View Answer
Answer: d
Explanation: The pulse width of the signal must be more than 50microseconds at the receiving terminal.

8. The level of the signal ERROR(active low) becomes ‘low’ when the printer is in
a) Paper end state
b) Offline state
c) Error state
d) All of the mentioned
View Answer
Answer: d
Explanation: The level of the signal ERROR(active low) becomes ‘low’ when the printer is in the Paper end state, Offline state and Error state.

9. The signals that are provided to maintain proper data flow and synchronization between the data transmitter and receiver are
a) handshaking signals
b) control signals
c) input signals

d) none
View Answer
Answer: a
Explanation: Handshaking signals maintain proper data flow and synchronization.

10. The feature of mode 2 of 8255 is
a) single 8-bit port is available
b) both inputs and outputs are latched
c) port C is used for generating handshake signals
d) all of the mentioned
View Answer
Answer: d
Explanation: In mode 2 of 8255, a single 8-bit port is available i.e group A.

1. The time taken by the ADC from the active edge of SOC(start of conversion) pulse till the active edge of EOC(end of conversion) signal is called
a) edge time
b) conversion time
c) conversion delay
d) time delay
View Answer
Answer: c
Explanation: Broadly speaking, the time taken by the converter to calculate the equivalent digital data output from the moment of the start of conversion is called conversion delay.

2. The popular technique that is used in the integration of ADC chips is
a) successive approximation
b) dual slope integration
c) successive approximation and dual slope integration
d) none
View Answer
Answer: c
Explanation: Successive approximation and dual slope integration are the most popular techniques that are used in the integrated ADC chips.

3. The procedure of algorithm for interfacing ADC contain
a) ensuring stability of analog input
b) issuing start of conversion pulse to ADC
c) reading digital data output of ADC as equivalent digital output
d) all of the mentioned
View Answer
Answer: d
Explanation: The general algorithm for interfacing ADC contains ensuring the stability of analog input, issuing start of conversion pulse to ADC, reading end of conversion signal to mark the end of a conversion process, reading digital data output of ADC as equivalent digital output.

4. Which is the ADC among the following?
a) AD 7523
b) 74373
c) 74245
d) ICL7109
View Answer

Answer: d
Explanation: AD 7523 is a DAC(Digital to analog converter), 74373 is a latch, 74245 is transceiver and ICL7109 is an ADC.

5. The conversion delay in a successive approximation of an ADC 0808/0809 is
a) 100 milliseconds
b) 100 microseconds
c) 50 milliseconds
d) 50 milliseconds
View Answer
Answer: b
Explanation: The conversion delay is 100microseconds which is low as compared to other converters.

6. The number of inputs that can be connected at a time to an ADC that is integrated with successive approximation is
a) 4
b) 2
c) 8
d) 16
View Answer
Answer: c
Explanation: As these converters internally have 3:8 analog multiplexer, at a time 8 different analog inputs can be connected to the chip.

7. ADC 7109 integrated by Dual slope integration technique is used for
a) low cost option
b) slow practical applications
c) low complexity
d) all of the mentioned
View Answer
Answer: d
Explanation: Compared to other 12-bit ADCs, it is of very low cost and useful for slow practical applications.

8. Which of the following is not one of the phases of the total conversion cycle?
a) autozero phase
b) conversion phase
c) signal integrate phase
d) disintegrate phase
View Answer
Answer: b
Explanation: Autozero phase, signal integrate phase and disintegrate phase are the three phases of total conversion cycle.

9. Which of the following phase contain feedback loop in it?
a) autozero phase
b) signal integrate phase
c) disintegrate phase
d) none
View Answer
Answer: a
Explanation: A feedback loop is closed around the system to charge the autozero

capacitor to compensate for the offset voltages in the buffer amplifier, integrator and comparator.

10. In the signal integrate phase, the differential input voltage between IN LO(input low) and IN HI(input high) pins is integrated by the internal integrator for a fixed period of
a) 256 clock cycles
b) 1024 clock cycles
c) 2048 clock cycles
d) 4096 clock cycles
View Answer
Answer: c
Explanation: The internal integrator needs 2048 clock cycles to integrate voltage difference between input low and input high.

1. DAC (Digital to Analog Converter) finds application in
a) digitally controlled gains
b) motor speed controls
c) programmable gain amplifiers
d) all of the mentioned
View Answer
Answer: d
Explanation: DAC is used in digitally controlled gains, motor speed controls and programmable gain amplifiers.

2. To save the DAC from negative transients the device connected between OUT1 and OUT2 of AD 7523 is
a) p-n junction diode
b) Zener
c) FET
d) BJT (Bipolar Junction transistor)
View Answer
Answer: b
Explanation: Zener is connected between OUT1 and OUT2 pins of AD7523 to save from negative transients.

3. An operational amplifier connected to the output of AD 7523 is used
a) to convert current output to output voltage
b) to provide additional driving capability
c) as current-to-voltage converter
d) all of the mentioned
View Answer
Answer: d
Explanation: An operational amplifier is used as a current-to-voltage converter to convert the current output to output voltage and also provides additional driving capability to the DAC.

4. The DAC 0800 has a settling time of
a) 100 milliseconds
b) 100 microseconds
c) 50 milliseconds
d) 50 microseconds
View Answer

Answer: a
Explanation: DAC 0800 has a settling time of 100 milliseconds.

5. The device that is used to obtain an accurate position control of rotating shafts in terms of steps is
a) DC motor
b) AC motor
c) Stepper motor
d) Servo motor
View Answer
Answer: c
Explanation: Stepper motor employs rotation of its shaft in terms of steps, rather than continuous rotation as in case of AC or DC motors.

6. The internal schematic of a typical stepper motor has
a) 1 winding
b) 2 windings
c) 3 windings
d) 4 windings
View Answer
Answer: d
Explanation: The internal schematic of a typical stepper motor has 4 windings.

7. The number of pulses required for one complete rotation of the shaft of the stepper motor is equal to the
a) number of internal teeth on a rotor
b) number of internal teeth on a stator
c) number of internal teeth on a rotor and stator
d) number of external teeth on a stator
View Answer
Answer: a
Explanation: The number of pulses required for one complete rotation of the shaft of the stepper motor is equal to the number of internal teeth on its rotor.

8. A simple scheme for rotating the shaft of a stepper motor is called
a) rotating scheme
b) shaft scheme
c) wave scheme
d) none
View Answer
Answer: c
Explanation: In this scheme, the windings are applied with the required voltage pulses, in a cyclic fashion.

9. The firing angles of thyristors are controlled by
a) pulse generating circuits
b) relaxation oscillators
c) microprocessor
d) all of the mentioned
View Answer
Answer: d
Explanation: In early days, the firing angles were controlled by a pulse generating circuits like relaxation oscillators and now, they are accurately fired using a microprocessor.

10. The Isolation transformers are generally used for
a) protecting low power circuit
b) isolation
c) protecting low power circuit and isolation
d) none
View Answer
Answer: c
Explanation: Any switching component of a high power circuit may be sufficient to damage the microprocessor system. So, to protect the low power circuit isolation transformers are used. They are also used if isolation is necessary.

1. The number of counters that are present in the programmable timer device 8254 is
a) 1
b) 2
c) 3
d) 4
View Answer
Answer: c
Explanation: There are three counters that can be used as either counters or delay generators.

2. The operation that can be performed on control word register is
a) read operation
b) write operation
c) read and write operations
d) none
View Answer
Answer: b
Explanation: The control word register can only be written and cannot be read.

3. The mode that is used to interrupt the processor by setting a suitable terminal count is
a) mode 0
b) mode 1
c) mode 2
d) mode 3
View Answer
Answer: a
Explanation: Mode 0 is also called as an interrupt on the terminal count.

4. In mode 2, if N is loaded as the count value, then after (N-1) cycles, the output becomes low for
a) 1 clockcycle
b) 2 clockcycles
c) 3 clockcycles
d) 4 clockcycles
View Answer
Answer: a
Explanation: After (N-1) cycles, the output becomes low for only 1 clockcycle. If the count N is reloaded and again the output becomes high and remains so for (N-1) clock pulses.

5. The generation of a square wave is possible in the mode
a) mode 1
b) mode 2
c) mode 3
d) mode 4
View Answer
Answer: c
Explanation: When the count N loaded is even, then for half of the count, the output remains high and for the remaining half it remains low. If the count loaded is odd, the first clock pulse decrements it by 1 resulting in an even count value.

6. In control word register, if SC1=0 and SC0=1, then the counter selected is
a) counter 0
b) counter 1
c) counter 2
d) none
View Answer
Answer: b
Explanation: SC denotes select counter.

7. In control word format, if RL1=1, RL0=1 then the operation performed is
a) read/load least significant byte only
b) read/load most significant byte only
c) read/load LSB first and then MSB
d) read/load MSB first and then LSB
View Answer
Answer: c
Explanation: To access 16 bit, first LSB is loaded first, and then MSB.

8. If BCD=0, then the operation is
a) decimal count
b) hexadecimal count
c) binary count
d) octal count
View Answer
Answer: b
Explanation: If BCD=0 then hexadecimal count. If BCD=1, then the operation is BCD count.

9. The counter starts counting only if
a) GATE signal is low
b) GATE signal is high
c) CLK signal is low
d) CLK signal is high
View Answer
Answer: b
Explanation: If the GATE signal is enabled, then the counter starts counting.

10. The control word register contents are used for
a) initializing the operating modes
b) selection of counters
c) choosing binary/BCD counters
d) all of the mentioned
View Answer

Answer: d
Explanation: The control word register contents are used for
i) initializing the operating modes (mode 0-mode 4)
ii) selection of counters (counter0-counter2)
iii) choosing binary or BCD counters
iv) loading of the counter registers.

1. The number of hardware interrupts that the processor 8085 consists of is
a) 1
b) 3
c) 5
d) 7
View Answer
Answer: c
Explanation: The processor 8085 has five hardware interrupt pins. Out of these five, four pins were alloted fixed vector addresses but the pin INTR was not alloted by vector address, rather an external device was supposed to hand over the type of the interrupt to the microprocessor.

2. The register that stores all the interrupt requests in it in order to serve them one by one on a priority basis is
a) Interrupt Request Register
b) In-Service Register
c) Priority resolver
d) Interrupt Mask Register
View Answer
Answer: a
Explanation: The interrupts at IRQ input lines are handled by Interrupt Request Register internally.

3. The register that stores the bits required to mask the interrupt inputs is
a) In-service register
b) Priority resolver
c) Interrupt Mask register
d) None
View Answer
Answer: c
Explanation: Also, Interrupt Mask Register operates on IRR(Interrupt Request Register) at the direction of the Priority Resolver.

4. The interrupt control logic
a) manages interrupts
b) manages interrupt acknowledge signals
c) accepts interrupt acknowledge signal
d) all of the mentioned
View Answer
Answer: d
Explanation: The interrupt control logic performs all the operations that are involved within the interrupts like accepting and managing interrupt acknowledge signals, interrupts.

5. In a cascaded mode, the number of vectored interrupts provided by 8259A is
a) 4
b) 8

c) 16
d) 64
View Answer
Answer: d
Explanation: A single 8259A provides 8 vectored interrupts. In cascade mode, 64 vectored interrupts can be provided.

6. When the PS(active low)/EN(active low) pin of 8259A used in buffered mode, then it can be used as a
a) input to designate chip is master or slave
b) buffer enable
c) buffer disable
d) none
View Answer
Answer: b
Explanation: When the pin is used in buffered mode, then it can be used as a buffer enable to control buffer transreceivers. If it is not used in buffered mode, then the pin is used as input to designate whether the chip is used as a master or a slave.

7. Once the ICW1 is loaded, then the initialization procedure involves
a) edge sense circuit is reset
b) IMR is cleared
c) slave mode address is set to 7
d) all of the mentioned
View Answer
Answer: d
Explanation: The initialization procedure involves
i) edge sense circuit is reset.
ii) IMR is cleared.
iii) IR7 input is assigned the lowest priority.
iv) slave mode address is set to 7
v) special mask mode is cleared and the status read is set to IRR.

8. When non-specific EOI command is issued to 8259A it will automatically
a) set the ISR
b) reset the ISR
c) set the INTR
d) reset the INTR
View Answer
Answer: b
Explanation: When non-specific EOI command is issued to 8259A it will automatically reset the highest ISR.

9. In the application where all the interrupting devices are of equal priority, the mode used is
a) Automatic rotation
b) Automatic EOI mode
c) Specific rotation
d) EOI
View Answer
Answer: a
Explanation: The automatic rotation is used in the applications where all the interrupting devices are of equal priority.

1. The registers that store the keyboard and display modes and operations programmed by CPU are
a) I/O control and data buffers
b) Control and timing registers
c) Return buffers
d) Display address registers
View Answer
Answer: b
Explanation: The control and timing register to store the keyboard and display modes and other operations programmed by CPU.

2. The sensor RAM acts as 8-byte first-in-first-out RAM in
a) keyboard mode
b) strobed input mode
c) keyboard and strobed input mode
d) scanned sensor matrix mode
View Answer
Answer: c
Explanation: In this mode, each key code of the pressed key is entered in the order of the entry, and in the meantime, read by the CPU, till the RAM becomes empty.

3. The registers that hold the address of the word currently being written by the CPU from the display RAM are
a) control and timing register
b) control and timing register and timing control
c) display RAM
d) display address registers
View Answer
Answer: d
Explanation: The display address registers holds the address of the word currently being written or read by the CPU to or from the display RAM.

4. When a key is pressed, a debounce logic comes into operation in
a) scanned keyboard special error mode
b) scanned keyboard with N-key rollover
c) scanned keyboard mode with 2 key lockout
d) sensor matrix mode
View Answer
Answer: c
Explanation: In scanned keyboard mode with 2 key lockout mode of operation, when a key is pressed, a debounce logic comes into operation. During the next two scans, other keys are checked for closure and if no other key is pressed then the first pressed key is identified.

5. The mode that is programmed using “end interrupt/error mode set command” is
a) scanned keyboard special error mode
b) scanned keyboard with N-key rollover
c) scanned keyboard mode with 2 key lockout
d) sensor matrix mode
View Answer
Answer: a
Explanation: The scanned keyboard special error mode is programmed using end

interrupt/error mode set command. This mode is valid only under the N-key rollover mode.

6. When a key is pressed, the debounce circuit waits for 2 keyboard scans and then checks whether the key is still depressed in
a) scanned keyboard special error mode
b) scanned keyboard with N-key rollover
c) scanned keyboard mode with 2 key lockout
d) sensor matrix mode
View Answer
Answer: b
Explanation: In this mode, When a key is pressed, the debounce circuit waits for 2 keyboard scans and then checks whether the key is still depressed. If it is still depressed, the code is entered in FIFO RAM.

7. The data that is entered from the left side of the display unit is of
a) left entry mode
b) right entry mode
c) left and right entry modes
d) none
View Answer
Answer: a
Explanation: The data that is entered from the left side of the display unit is of left entry mode, as in a type-writer the first character typed appears at the left-most position, while the subsequent characters appear successively to the right of the first one.

8. The FIFO status word is used to indicate the error in
a) keyboard mode
b) strobed input mode
c) keyboard and strobed input mode
d) scanned sensor matrix mode
View Answer
Answer: c
Explanation: Overrun error occurs when an already full FIFO has attempted an entry. Underrun error occurs when an empty FIFO read is attempted.

9. The flag that increments automatically after each read or write operation to the display RAM is
a) IF
b) RF
c) AI
d) WF
View Answer
Answer: c
Explanation: AI refers to auto increment flag.

10. If any change in sensor value is detected at the end of a sensor matrix scan, then the IRQ line
a) goes low
b) goes high
c) remains unchanged
d) none
View Answer

Answer: b
Explanation: In sensor matrix mode, the IRQ line goes high, if any change in sensor value is detected at the end of a sensor matrix scan or the sensor RAM has a previous entry to be read by the CPU.

1. Which of the following is not a mode of data transmission?
a) simplex
b) duplex
c) semi duplex
d) half duplex
View Answer
Answer: c
Explanation: Basically, there are three modes of data transmission. simplex, duplex and half duplex.

2. If the data is transmitted only in one direction over a single communication channel, then it is of
a) simplex mode
b) duplex mode
c) semi duplex mode
d) half duplex mode
View Answer
Answer: a
Explanation: In simplex mode, the data transmission is unidirectional. For example, a CPU may transmit data for a CRT display unit in this mode.

3. If the data transmission takes place in either direction, but at a time data may be transmitted only in one direction then, it is of
a) simplex mode
b) duplex mode
c) semi duplex mode
d) half duplex mode
View Answer
Answer: d
Explanation: In half duplex mode, data transmission is bidirectional but not at a time. For example, Walkie-Talkie.

4. In 8251A, the pin that controls the rate at which the character is to be transmitted is
a) TXC(active low)
b) TXC(active high)
c) TXD(active low)
d) RXC(active low)
View Answer
Answer: a
Explanation: Transmitter Clock Input (TXC(active low)) is a pin that controls the rate at which the character is to be transmitted.

5. TXD(Transmitted Data Output) pin carries serial stream of the transmitted data bits along with
a) start bit
b) stop bit
c) parity bit
d) all of the mentioned
View Answer

Answer: d
Explanation: Transmitted Data Output pin carries a serial stream of the transmitted data bits along with other information like start bits, stop bits and parity bits etc.

6. The signal that may be used either to interrupt the CPU or polled by the CPU is
a) TXRDY(Transmitter ready)
b) RXRDY(Receiver ready output)
c) DSR(active low)
d) DTR(active low)
View Answer
Answer: b
Explanation: RXRDY(Receiver ready output) may be used either to interrupt the CPU or polled by the CPU.

7. The disadvantage of RS-232C is
a) limited speed of communication
b) high-voltage level signaling
c) big-size communication adapters
d) all of the mentioned
View Answer
Answer: d
Explanation: RS232C has been used for long and has a few disadvantages like limited speed of communication, high-voltage level signaling and big-size communication adapters.

8. The USB supports the signaling rate of
a) full-speed USB 1.0 at rate of 12 Mbps
b) high-speed USB 2.0 at rate of 480 Mbps
c) super-speed USB 3.0 at rate of 596 Mbps
d) all of the mentioned
View Answer
Answer: d
Explanation: The USB standards support the signaling rates. Also, USB signaling is implemented in a differential in low- and full-speed options.

9. The bit packet that commands the device either to receive data or transmit data in transmission of USB asynchronous communication is
a) Handshake packet
b) Token packet
c) PRE packet
d) Data packet
View Answer
Answer: b
Explanation: The token packet is the second type of packet which commands the device either to receive data or transmit data.

10. High speed USB devices neglect
a) Handshake packet
b) Token packet
c) PRE packet
d) Data packet
View Answer
Answer: c
Explanation: PRE packets are only of importance to low-speed USB devices.

**SARANATHAN COLLEGE OF ENGINEERING**

**TRICHY-12**

**Department of Electrical and Electronics Engineering**

**EE8552 POWER ELECTRONICS**

**Regulation-2017,Odd Semester**

**MULTIPLE CHOICE QUESTIONS**

1. Which of the following devices does not belong to the transistor family?
a) IGBT
b) MOSFET
c) GTO
d) BJT
View Answer
Answer: c
Explanation: GTO is gate turn off transistor, it belongs to the Thyristor family. All the other devices belong to the transistor family.

2. A power transistor is a
a) three layer, three junction device
b) three layer, two junction device
c) two layer, one junction device
d) four layer, three junction device
View Answer
Answer: b
Explanation: It has three layers p-n-p or n-p-n forming two p-n junctions.

3. In a power transistor,_____is the controlled parameter.
a) $V_{BE}$
b) $V_{CE}$
c) $I_B$
d) $I_C$
View Answer
Answer: d
Explanation: The collector current is the controlled parameter.

4. A power transistor is a_____device.
a) two terminal, bipolar, voltage controlled
b) two terminal, unipolar, current controlled
c) three terminal, unipolar, voltage controlled

d) three terminal, bipolar, current controlled
View Answer
Answer: d
Explanation: Power transistor is simply many BJT's connected in series parallel on a single silicon chip for power applications. It is a three terminal, bipolar, current controlled device.

5. In a power transistor,_____is the controlling parameter.
a) $V_{BE}$
b) $V_{CE}$
c) $I_B$
d) $I_C$
View Answer
Answer: c
Explanation: The base current controls the collector current. Hence, the base current Ib is the controlling parameter.

6. In a power transistor, the $I_B$ vs $V_{BE}$ curve is
a) a parabolic curve
b) an exponentially decaying curve
c) resembling the diode curve
d) a straight line $Y = I_B$
View Answer
Answer: c
Explanation: The B-E junction of a BJT resembles a p-n junction diode, hence the curve.

7. For a power transistor, if the base current $I_B$ is increased keeping $V_{CE}$ constant, then
a) $I_C$ increases
b) $I_C$ decreases
c) $I_C$ remains constant
d) none of the mentioned
View Answer
Answer: a
Explanation: Ic is directly proportional to Ic.

8. The forward current gain α is given by
a) $I_C/I_B$
b) $I_C/I_E$
c) $I_E/I_C$
d) $I_E/I_B$
View Answer
9. The value of β is given by the expression
a) $I_C/I_B$
b) $I_C/I_E$

c) $I_E/I_C$
d) $I_E/I_B$
View Answer
Answer: a
Explanation: Collector current by the base current is beta, its value is in the range 50 to 300.

10. A power BJT is used as a power control switch by biasing it in the cut off region (off state) or in the saturation region (on state). In the on state
a) both the base-emitter & base-collector junctions are forward biased
b) the base-emitter junction is reverse biased, and the base collector junction is forward biased
c) the base-emitter junction is forward biased, and the base collector junction is reversed biased
d) both the base-collector & the base-emitter junctions are reversed biased
View Answer
Answer: a
Explanation: When base-emitter & base-collector junctions are forward biased only than both the p-n junctions are forward biased and the device is on.

1. For a power transistor, if the forward current gain $\alpha = 0.97$, then $\beta = ?$
a) 0.03
b) 2.03
c) 49.24
d) 32.33
View Answer
Answer: d
Explanation: Use the relation $\alpha = \beta/(\beta+1)$.

2. The power electronics devices have a very high efficiency because
a) cooling is very efficient
b) the devices traverse active region at high speed & stays at the two states, on and off
c) the devices never operate in active region
d) the devices always operate in the active region
View Answer
Answer: b
Explanation: They are efficient due to their higher transition speeds.

3. For a power transistor, which of the following relations is true?
a) Ie>Ic>Ib
b) Ib>Ic>Ie
c) Ic>Ie>Ib
d) Ie=Ib
View Answer

Answer: a
Explanation: Practically speaking Ie = Ib+Ic. Ie is the highest as it is the sum of the collector and base currents. The base current is the smallest.

4. High frequency operation of any device is limited by the
a) forward voltage rating
b) switching losses
c) thermal conductivity
d) heat Sink arrangements
View Answer
Answer: b
Explanation: Lower the switching losses higher the frequency of operation of the device.

5. The instantaneous power loss during the delay time of a transistor is given by
a) Ic Vce
b) Ib Vbe
c) Ic Vbe
d) Ib Vce
View Answer
Answer: a
Explanation: During the delay time only the collector current flows & base to emitter voltage is zero.

6. For a power transistor, the average power loss during the delay time can be given by the equation
a) Ic * Vc
b) $1/T * \int^{Td}$ (Ic Vce) dt
c) Ic * dVc/dt * T
d) $1/T * \int^{(Td * Tr)}$ (Ic Vc) dt
View Answer
Answer: b
Explanation: During the delay time only, the collector current flows & base to emitter voltage is zero. Hence the average power can be found, simply by integrating it over the total delay time & dividing by the base time period.

7. A 1mv of i/p gives an output of 1V, the voltage gain as such would be
a) 0.001
b) 0.0001
c) 1000
d) 100
View Answer
Answer: c
Explanation: 1V/1mv = 1000.

8. Which of the following relations is true for a BJT?
a) Ic ≈ Ie
b) Ib ≈ Ic
c) Ie ≈ Ib
d) Ib ≈ Ie ≈ Ic
View Answer
Answer: a
Explanation: The collector & emitter current differ only by the base current, which is very very small.

9. Choose the correct statement
a) A transistor will remain on as long the the base current is applied
b) A transistor remains on after a high to low pulse is applied at the base
c) A transistor will remain on as long the the collector current is applied
d) A transistor remains on after a high to low pulse is applied at the collector
View Answer
Answer: a
Explanation: Unlike the thyristor devices, all the transistor family devices remain in the conducting state as long as the firing pulses are applied. This is a very important property of the transistor devices.

10. Let's say that a transistor is operating at the middle of the load line, then a decrease in the current gain would
a) move the Q point up
b) move the Q point down
c) result in to & fro motion of the Q point
d) not change the Q point
View Answer
Answer: b
Explanation:The current gain would decreases the collector current, shifting the Q point below.

1. The MOSFET combines the areas of_____& _____
a) field effect & MOS technology
b) semiconductor & TTL
c) mos technology & CMOS technology
d) none of the mentioned
View Answer
Answer: a
Explanation: It is an enhancement of the FET devices (field effect) using MOS technology.

2. Which of the following terminals does not belong to the MOSFET?
a) Drain

b) Gate
c) Base
d) Source
View Answer
Answer: c
Explanation: MOSFET is a three terminal device D, G & S.

3. Choose the correct statement
a) MOSFET is a uncontrolled device
b) MOSFET is a voltage controlled device
c) MOSFET is a current controlled device
d) MOSFET is a temperature controlled device
View Answer
Answer: b
Explanation: It is a voltage controlled device.

4. Choose the correct statement(s)
i) The gate circuit impedance of MOSFET is higher than that of a BJT
ii) The gate circuit impedance of MOSFET is lower than that of a BJT
iii) The MOSFET has higher switching losses than that of a BJT
iv) The MOSFET has lower switching losses than that of a BJT
a) Both i & ii
b) Both ii & iv
c) Both i & iv
d) Only ii
View Answer
Answer: c
Explanation: MOSFET requires gate signals with lower amplitude as compared to BJTs & has lower switching losses.

5. Choose the correct statement
a) MOSFET is a unipolar, voltage controlled, two terminal device
b) MOSFET is a bipolar, current controlled, three terminal device
c) MOSFET is a unipolar, voltage controlled, three terminal device
d) MOSFET is a bipolar, current controlled, two terminal device
View Answer
Answer: c
Explanation: MOSFET is a three terminal device, Gate, source & drain. It is voltage controlled unlike the BJT & only electron current flows.

6. The arrow on the symbol of MOSFET indicates
a) that it is a N-channel MOSFET
b) the direction of electrons
c) the direction of conventional current flow

d) that it is a P-channel MOSFET
View Answer
Answer: b
Explanation: The arrow is to indicate the direction of electrons (opposite to the direction of conventional current flow).

7. The controlling parameter in MOSFET is
a) Vds
b) Ig
c) Vgs
d) Is
View Answer
Answer: b
Explanation: The gate to source voltage is the controlling parameter in a MOSFET.

8. In the internal structure of a MOSFET, a parasitic BJT exists between the
a) source & gate terminals
b) source & drain terminals
c) drain & gate terminals
d) there is no parasitic BJT in MOSFET
View Answer
Answer: b
Explanation: Examine the internal structure of a MOSFET, notice the n-p-n structure between the drain & source. A p-channel MOSFET will have a p-n-p structure.

9. In the transfer characteristics of a MOSFET, the threshold voltage is the measure of the
a) minimum voltage to induce a n-channel/p-channel for conduction
b) minimum voltage till which temperature is constant
c) minimum voltage to turn off the device
d) none of the above mentioned is true
View Answer
Answer: a
Explanation: It is the minimum voltage to induce a n-channel/p-channel which will allow the device to conduct electrically through its length.

10.The output characteristics of a MOSFET, is a plot of
a) Id as a function of Vgs with Vds as a parameter
b) Id as a function of Vds with Vgs as a parameter
c) Ig as a function of Vgs with Vds as a parameter
d) Ig as a function of Vds with Vgs as a parameter
View Answer
Answer: b
Explanation: It is Id vs Vds which are plotted for different values of Vgs (gate to source voltage).

1. In the output characteristics of a MOSFET with low values of Vds, the value of the on-state resistance is
a) Vds/Ig
b) Vds/Id
c) 0
d) ∞
View Answer
Answer: b
Explanation: The o/p characteristics Is a plot of Id verses Vds, which for low values of Vds is almost constant. Hence, the on-state resistance is constant & the slop is its constant value.

2. At turn-on the initial delay or turn on delay is the time required for the
a) input inductance to charge to the threshold value
b) input capacitance to charge to the threshold value
c) input inductance to discharge to the threshold value
d) input capacitance to discharge to the threshold value
View Answer
Answer: b
Explanation: It is the time required for the input capacitance to charge to the threshold value, which depends on the device configuration. The device can start conducting only after this time.

3. Choose the correct statement
a) MOSFET suffers from secondary breakdown problems
b) MOSFET has lower switching losses as compared to other devices
c) MOSFET has high value of on-state resistance as compared to other devices
d) All of the mentioned
View Answer
Answer: b
Explanation: MOSFET has lower switching losses due to its unipolar nature & less turn off time. All of the other statements are false.

4. Which among the following devices is the most suited for high frequency applications?
a) BJT
b) IGBT
c) MOSFET
d) SCR
View Answer
Answer: c
Explanation: MOSFET has the least switching losses among the rest of the devices.

5. Choose the correct statement
a) MOSFET has a positive temperature co-efficient

b) MOSFET has a high gate circuit impedance
c) MOSFET is a voltage controlled device
d) All of the mentioned
View Answer
Answer: d
Explanation: MOSFETs are voltage controlled devices. They have high gate circuit impedance and are PTC devices.

6. Consider an ideal MOSFET. If Vgs = 0V, then Id = ?
a) Zero
b) Maximum
c) Id(on)
d) Idd
View Answer
Answer: a
Explanation: Gate current = 0 so device is off (ideally).

7. For a MOSFET Vgs=3V, Idss=5A, and Id=2A. Find the pinch of voltage Vp
a) 4.08
b) 8.16
c) 16.32
d) 0V
View Answer
Answer: b
Explanation: Use Id = Idd x $[1-Vgs/Vp]^2$.

8. How does the MOSFET differ from the JFET?
a) JFET has a p-n junction
b) They are both the same
c) JFET is small in size
d) MOSFET has a base terminal
View Answer
Answer: a
Explanation: None.

9. The basic advantage of the CMOS technology is that
a) It is easily available
b) It has small size
c) It has lower power consumption
d) It has better switching capabilities
View Answer
Answer: c
Explanation: Complementary MOS consumes very less power as compared to all the earlier devices.

10. The N-channel MOSFET is considered better than the P-channel MOSFET due to its
a) low noise levels
b) TTL compatibility
c) lower input impedance
d) faster operation
View Answer
Answer: d
Explanation: The N-channel are faster than the P-channel type.

1. IGBT possess
a) low input impedance
b) high input impedance
c) high on-state resistance
d) second breakdown problems
View Answer
Answer: b
Explanation: Like MOSFET IGBT possess high input impedance.

2. IGBT & BJT both posses ____
a) low on-state power losses
b) high on-state power losses
c) low switching losses
d) high input impedance
View Answer
Answer: a
Explanation: Low on state power loss is one of the best parameters of both BJT & the IGBT.

3. The three terminals of the IGBT are
a) base, emitter & collector
b) gate, source & drain
c) gate, emitter & collector
d) base, source & drain
View Answer
Answer: c
Explanation: IGBT is a three terminal device. It has a gate, a emitter & a collector.

4. In IGBT, the $p^+$ layer connected to the collector terminal is called as the
a) drift layer
b) injection layer
c) body layer
d) collector Layer
View Answer

Answer: b
Explanation: It is called as a injection layer, because it injects holes into the $n^-$ layer.

5. The controlling parameter in IGBT is the
a) $I_G$
b) $V_{GE}$
c) $I_C$
d) $V_{CE}$
View Answer
Answer: b
Explanation: The controlling parameter is the gate to emitter voltage, as the device is a voltage controlled device.

6. In IGBT, the $n^-$ layer above the $p^+$ layer is called as the
a) drift layer
b) injection layer
c) body layer
d) collector Layer
View Answer
Answer: a
Explanation: It is called as the drift layer because its thickness determines the voltage blocking capabilities of the device.

7. The voltage blocking capability of the IGBT is determined by the
a) injection layer
b) body layer
c) metal used for the contacts
d) drift layer
View Answer
Answer: d
Explanation: The drift layer which is a $n^-$ layer determines the voltage blocking capabilities.

8. The controlled parameter in IGBT is the
a) $I_G$
b) $V_{GE}$
c) $I_C$
d) $V_{CE}$
View Answer
Answer: c
Explanation: The controlling parameter is the gate to collector current.

9. The structure of the IGBT is a
a) P-N-P structure connected by a MOS gate
b) N-N-P-P structure connected by a MOS gate

c) P-N-P-N structure connected by a MOS gate
d) N-P-N-P structure connected by a MOS gate
View Answer
Answer: c
Explanation: The IGBT is a semiconductor device with four alternating layers (P-N-P-N) that are controlled by a metal-oxide-semiconductor (MOS) gate structure without regenerative action.

10. The major drawback of the first generation IGBTs was that, they had
a) latch-up problems
b) noise & secondary breakdown problems
c) sluggish operation
d) latch-up & secondary breakdown problems
View Answer
Answer: d
Explanation: The earlier IGBT's had latch-up problems (device cannot turn off even after the gate signal is removed), and secondary breakdown problems (in which a localized hotspot in the device goes into thermal runaway and burns the device out at high currents).

1. When latch-up occurs in an IGBT
a) Ig is no longer controllable
b) Ic is no longer controllable
c) the device turns off
d) Ic increases to a very high value
View Answer
Answer: b
Explanation: After latch-up the collector emitter current is no longer in control of the gate terminal.

2. A latched up IGBT can be turned off by
a) forced commutation of current
b) forced commutation of voltage
c) use of a snubber circuit
d) none of the mentioned
View Answer
Answer: a
Explanation: Forced commutation of current is the only way to turn off a latched up IGBT.

3. The static V-I curve of an IGBT is plotted with
a) Vce as the parameter
b) Ic as the parameter
c) Vge as the parameter

d) Ig as the parameter
View Answer
Answer: c
Explanation: V-I curves are plotted for Ic vs Vce with the controlling parameter (Vge) as a parameter.

4. Latch-up occurs in an IGBT when
a) Vce reaches a certain value
b) Ic reaches a certain value
c) Ig reaches a certain value
d) the device temperature reaches a certain value
View Answer
Answer: b
Explanation: Latch up occurs when the current through the device (Ic) collector current increases beyond a certain value.

5. In an IGBT, during the turn-on time
a) Vge decreases
b) Ic decreases
c) Vce decreases
d) none of the mentioned
View Answer
Answer: c
Explanation: Vce decreases from 0.9 to 0.1 of the initial value whereas others increase.

6. Choose the correct statement
a) IGBTs have higher switching losses as compared to BJTs
b) IGBTs have secondary breakdown problems
c) IGBTs have lower gate drive requirements
d) IGBTs are current controlled devices
View Answer
Answer: c
Explanation: Due to its high gate impedance, IGBTs require less gate drive current.

7. The approximate equivalent circuit of an IGBT consists of
a) a BJT & a MOSFET
b) a MOSFET & a MCT
c) two BJTs
d) two MOSFETs
View Answer
Answer: a
Explanation: Gate of the MOSFET forms the gate terminal of the IGBT, the source of MOSFET is connected to the base of the BJT and drain to the collector.

8. An IGBT is also know as
a) MOIGT (Metal oxide insulated gate transistor)
b) COMFET (Conductively modulated FET)
c) GEMFET (Grain modulated FET)
d) all of the mentioned
View Answer
Answer: d
Explanation: All of the above mentioned are alternate names of IGBTs.

9. The body of an IGBT consists of a
a) p-layer
b) n-layer
c) p-n layer
d) metal
View Answer
Answer: a
Explanation: IGBT has a p-n-p structure with fingers of $n^+$ layers into the p layer. The p layer has the largest cross section and forms the body of the IGBT.

10. At present, the state-of-the-art semiconductor devices are begin manufactured using
a) Semiconducting Diamond
b) Gallium-Arsenide
c) Germanium
d) Silicon-Carbide
View Answer
Answer: d
Explanation: All of the above mentioned can be used but Si-Ca has certain advantages over the other materials.

1. For a transistor, the safe operating area (SOA) is a plot of
a) Ib versus Vce
b) Ib versus Ic
c) Ic versus Vce
d) Ic versus time
View Answer
Answer: c
Explanation: For reliable operation the collector current & voltage must remain within the SOA curves.

2. The forward safe operating area (FSOA) pertains to the operation when
a) the device is fired at a 50% Duty cycle
b) the device is forward-biased
c) the device is operated on AC

d) the device is operated on DC
View Answer
Answer: b
Explanation: The FSOA is for forward biased operations. The FSOA is plotted for AC as well as DC for different duty cycles. Hence, option (b) is the most appropriate choice.

3. The SOAs are plotted always on a_____scale
a) time
b) frequency
c) logarithmic
d) polynomial
View Answer
Answer: c
Explanation: The scale is always logarithmic, irrespective of the type of device.

4. As the FSOA increases, the pulse width
a) decreases
b) increases
c) remains constant
d) vanishes
View Answer
Answer: b
Explanation: On reduced pulse width values, the devices can operated on higher voltages & currents.

5. The SOAs provided by the manufacturers are for
a) single pulse operation & a particular temperature
b) multi pulse operation & all the temperature
c) all the conditions
d) a particular duty cycle operation
View Answer
Answer: a
Explanation: The manufacturer specifies the SOAs only for single pulse DC operation & a particular temperature (usually 20Degree Centigrade Scale). For actual operations, The SOA's have to be modified using the thermal impedance charts.

6. A device is operating at Ic = 4A & Vce = 50V. For the device to operate at Ic = 20A (Without damaging),
a) voltage should be increased
b) voltage should be reduced
c) voltage can be kept constant
d) current has to increased further
View Answer

Answer: b
Explanation: For safe operation, the values should be within the limits. P = V.I – with increase in one of the values, another value should decrease.

7. For a BJT, find the maximum power dissipation when the device is safely operated at Vce = 90V and Ic = 0.5A
a) 40 Watts
b) 35 Watts
c) 45 Watts
d) 30 Watts
View Answer
Answer: c
Explanation: P=90*0.5=45Watts.

8. The SOA for a MOSFET is plotted for
a) Id versus Vds
b) Ig versus Id
c) Ig versus Vds
d) Id versus Vgs
View Answer
Answer: a
Explanation: It is a plot of drain current vs drain to source voltage.

9. The SOA for an IGBT is plotted for
a) Ic versus Vge
b) Ig versus Ic
c) Ig versus Vce
d) Ic versus Vce
View Answer
Answer: d
Explanation: It is a plot of collector current vs collector to emitter voltage.

10. For MOSFET's SOA, as the pulse width goes on increasing, the maximum voltage rating_____& current rating _____
a) is constant, increases
b) increases, decreases
c) decreases, is constant
d) constant, decreases
View Answer
Answer: c
Explanation: Refer MOSFET's SOA

1. A thyristor (SCR) is a
a) P-N-P device
b) N-P-N device

c) P-N-P-N device
d) P-N device
View Answer
Answer: c
Explanation: An SCR (silicon controlled rectifier) is a four layer p-n-p-n type device.

2. Which terminal does not belong to the SCR?
a) Anode
b) Gate
c) Base
d) Cathode
View Answer
Answer: c
Explanation: The SCR is having three terminals viz. anode, cathode and the gate.

3. An SCR is a
a) four layer, four junction device
b) four layer, three junction device
c) four layer, two junction device
d) three layer, single junction device
View Answer
Answer: b
Explanation: SCR is a four layer p-n-p-n device which forms three p-n junctions.

4. Choose the false statement.
a) SCR is a bidirectional device
b) SCR is a controlled device
c) In SCR the gate is the controlling terminal
d) SCR are used for high-power applications
View Answer
Answer: a
Explanation: It is a unidirectional device, current only flows from anode to cathode.

5. In the SCR structure the gate terminal is located
a) near the anode terminal
b) near the cathode terminal
c) in between the anode & cathode terminal
d) none of the mentioned
View Answer
Answer: b
Explanation: The gate is located near the cathode, because it allows fast turning on of the device when the gate signal is applied by forward basing the second junction.

6. The static V-I curve for the SCR is plotted for
a) Ia (anode current) vs Ig (gate current), Va (anode – cathode voltage) as a parameter

b) Ia vs Va with Ig as a parameter
c) Va vs Ig with Ia as a parameter
d) Ig vs Vg with Ia as a parameter
View Answer
Answer: b
Explanation: The curve is plotted for Ia vs Va for different values of gate current Ig.

7. If the cathode of an SCR is made positive with respect to the anode & no gate current is applied then
a) all the junctions are reversed biased
b) all the junctions are forward biased
c) only the middle junction is forward biased
d) only the middle junction is reversed biased
View Answer
Answer: c
Explanation: The device is in the reverse blocking state (3rd quadrant) & only the middle junction is forward biased whereas other two are reversed biased.

8. For an SCR in the reverse blocking mode, (practically)
a) leakage current does not flow
b) leakage current flows from anode to cathode
c) leakage current flows from cathode to anode
d) leakage current flows from gate to anode
View Answer
Answer: c
Explanation: In the reverse blocking mode, the gate current is zero & a reverse voltage is applied at the cathode-anode.

9. With the anode positive with respect to the cathode & the gate circuit open, the SCR is said to be in the
a) reverse blocking mode
b) reverse conduction mode
c) forward blocking mode
d) forward conduction mode
View Answer
Answer: c
Explanation: The SCR is in the forward blocking mode with its top and bottom junctions forward biased and the middle junction reversed biased.

10. For an SCR in the forward blocking mode (practically)
a) leakage current does not flow
b) leakage current flows from anode to cathode
c) leakage current flows from cathode to anode

d) leakage current flows from gate to anode
View Answer
Answer: b
Explanation: In the forward blocking mode, the gate current is zero & only the middle J2 junction is reversed biased.

1. The forward break over voltage is the
a) anode-cathode voltage at which conduction starts with gate signal applied
b) anode-cathode voltage at which conduction starts with no gate signal applied
c) gate voltage at which conduction starts with no anode-cathode voltage
d) gate voltage at which conduction starts with anode-cathode voltage applied
View Answer
Answer: b
Explanation: It is the forward voltage at which the middle junction breaks down without any gate signal and pushes the device into the conducting state.

2. For a forward conducting SCR device, as the forward anode to cathode voltage is increased
a) the device turns on at higher values of gate current
b) the device turns on at lower values of gate current
c) the forward impedance of the device goes on increasing
d) the forward impedance of the device goes on decreasing
View Answer
Answer: b
Explanation: Higher the value of anode-cathode forward voltage, lower the gate requirements of the device. Also, the forward resistance of the device is always constant as long as the junction temperature is constant.

3. A thyristor can be bought from the forward conduction mode to forward blocking mode by
a) the dv/dt triggering method
b) applying a negative gate signal
c) applying a positive gate signal
d) applying a reverse voltage across anode-cathode terminals
View Answer
Answer: d
Explanation: a) & c) are used to turn on the device, b) will damage the SCR.

4. Usually the forward voltage triggering method is not used to turn-on the SCR because
a) it increases losses
b) it causes noise production
c) it may damage the junction & destroy the device
d) relatively it’s an inefficient method
View Answer

Answer: c
Explanation: In forward voltage triggering the middle junction breaks down without any gate signal and pushes the device into the conducting state. This method can permanently damage the J2 junction and make the device useless.

5. Among the following, the most suitable method to turn on the SCR device is the
a) gate triggering method
b) dv/dt triggering method
c) forward voltage triggering method
d) temperature triggering method
View Answer
Answer: a
Explanation: d) & b) are unreliable methods, c) can permanently damage the SCR
Gate triggering is simple, reliable & most efficient.

6. The forward break over voltage is maximum when
a) Gate current = ∞
b) Gate current = 0
c) Gate current = -∞
d) It is independent of gate current
View Answer
Answer: b
Explanation: Higher the value of anode-cathode forward voltage, lower the gate requirements of the device.

7. For the SCR to remain in the ON (conducting) state
a) gate signal is continuously required
b) no continuous gate signal is required
c) no forward anode-cathode voltage is required
d) negative gate signal is continuously required
View Answer
Answer: b
Explanation: Unlike the transistor devices, once the SCR is turned on by the gate terminal, the gate terminal losses its control over the device.

8. The value of anode current required to maintain the conduction of an SCR even though the gate signal is removed is called as the
a) holding current
b) latching current
c) switching current
d) peak anode current
View Answer
Answer: b
Explanation: It is the minimum anode current value required to maintain the conduction

of an SCR even though the gate signal is removed. It is a very important parameter when employing an SCR in any circuit.

9. In the reverse blocking mode the middle junction ($J_2$) has the characteristics of that of a
a) transistor
b) capacitor
c) inductor
d) none of the mentioned
View Answer
Answer: b
Explanation: It is like a capacitor, as the dv/dt voltage triggering turns on the device. The charging current is given by,
$I_C = C_j dV_a/dt$.

10. _____are semiconductor thyristor devices which can be turned-on by light of appropriate wavelengths.
a) LGTOs
b) LASERs
c) MASERs
d) LASCRs
View Answer
Answer: d
Explanation: LASCR stands for light activated SCRs, which can be turned on in made to conduct by firing appropriate light pulses at its gate region.

# SARANATHAN COLLEGE OF ENGINEERIN

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**
**EE 8591 – Discrete Time Signals and Systems**
**Regulation 2017, Odd Semester**
**Multiple Choice Questions**

1. A signal can be represented in
(a) time domain(b) frequency domain(c) both (a) and (b)(d) none of these

2. $\delta(n)$ =
(a) $u(n) + u(n-1)$ (b) $u(n)\,u(n-1)$(c) $u(n) - u(n-1)$ (d) $u(n-1) - u(n)$

3. A deterministic signal has
(a) no uncertainty (b) uncertainty(c) partial uncertainty (d) none of these

4. A random signal has
(a) no uncertainty (b) uncertainty(c) partial uncertainty(d) none of these

5. The fundamental period of a discrete-time complex exponential sequence is $N$ =
(a)$\frac{2\pi}{\omega_0}$(b) $\frac{2\pi.\omega_0}{m}$ (c)$\frac{2\pi}{\omega_0}m$ (d) $2\pi m\omega_0$

6. The fundamental period of a sinusoidal sequence is $N$ =
(a) 2πm (b) $\frac{\omega_0}{2\pi m}$ (c) $m\omega_0$ (d) $\frac{2\pi}{\omega_0}m$

7. A signal is an energy signal if
(a) $E = 0$, $P = 0$(b) $E$ = infinite, $P$ = finite(c) $E$ = finite, $P = 0$(d) $E$ = finite, $P$ = infinite

8. A signal is a power signal if
(a) $P$ = finite, $E = 0$(b) $P$ = finite, $E$ = infinite (c) $P$ = finite, $E$ = finite(d) $P$ = infinite, $E$ = infinite

9. 9. The signal $\alpha^n.u(n)$ is an energy signal if
(a) $|\alpha| < 1$(b) $|\alpha| > 1$(c) $|\alpha| = 1$(d) $|\alpha| = 0$

10. The signal $\alpha^n.u(n)$ is a power signal if
(a) $|\alpha| < 1$ (b) $|\alpha| > 1$ (c) $|\alpha| = 1$ (d) $|\alpha| = 0$

11. A system whose output depends on future inputs is a
(a) static system(b) dynamic system(c) non-causal system(d) both (b) and (c)

12. A non-anticipative system is a
(a) static system(b) dynamic system(c) causal system(d) non-causal system

13. $y(n) = x(n + 2)$ is for a
(a) linear system(b) dynamic system(c) both linear and dynamic system(d) non-linear system

14. $y(n) = x(2n)$ is for a
(a) time-invariant system (b) time varying, dynamic system(c) linear, time varying, dynamic system
(d) linear, time-invariant, static system

15. $y(n) = x(-n)$ is for a
(a) non-causal system(b) linear, causal, time-invariant system(c) linear, non-causal, time-invariant system(d) linear, non-causal, time varying, dynamic system

16. $y(n) = x(n) + nx(n-1)$ is for a
(a) dynamic system(b) causal system(c) linear system(d) all of these

17.$y(n) = x(n)\, u(n)$ is for a
(a) static, linear system(b) causal, time-invariant system(c) both (a) and (b)(d) none of these

18. A system which has a unique relation between its input and output is called
(a) linear system(b) causal system(c) time-invariant system(d) invertible system

19. A system which does not have a unique relation between its input and output iscalled
(a) non-linear system(b) non-causal system(c) time-variant system(d) non-invertible system

**1.** (c)**2.** (c)**3.** (a)**4.** (b)**5.** (c)**6.** (d)**7.** (c)**8.** (b)**9.** (a)**10.** (c)
**11.** (d)**12.** (c)**13.** (c)**14.** (c)**15.** (d)**16.** (d)**17.** (a)**18.** (d)**19.** (d)

**Convolution and Propoerties**

1. For a non-causal system $h(n)$ excited by a non-causal input $x(n)$, the given by

(a) $y(n) = \sum_{k=-\infty}^{\infty} x(k)\, h(n-k)$ (b) $y(n) = \sum_{k=0}^{\infty} x(k)\, h(n-k)$

(c) $y(n) = \sum_{k=-\infty}^{n} x(k)\, h(n-k)$ (d) $y(n) = \sum_{k=0}^{n} x(k)\, h(n-k)$

2. For a non-causal system $h(n)$ excited by a causal input $x(n)$, the output given by

(a) $y(n) = \sum_{k=-\infty}^{\infty} x(k)\, h(n-k)$ (b) $y(n) = \sum_{k=0}^{\infty} x(k)\, h(n-k)$

(c) $y(n) = \sum_{k=-\infty}^{n} x(k)\, h(n-k)$ (d) $y(n) = \sum_{k=0}^{n} x(k)\, h(n-k)$

3. For a causal system $h(n)$ excited by a non-causal input $x(n)$, the output $y(n)$ is given by

(a) $y(n) = \sum_{k=-\infty}^{\infty} x(k)\, h(n-k)$ (b) $y(n) = \sum_{k=0}^{\infty} x(k)\, h(n-k)$

(c) $y(n) = \sum_{k=-\infty}^{n} x(k)\, h(n-k)$ (d) $y(n) = \sum_{k=0}^{n} x(k)\, h(n-k)$

4. For a causal system $h(n)$ excited by a causal input $x(n)$, the output $y(n)$ is given by

(a) $y(n) = \sum_{k=-\infty}^{\infty} x(k)\, h(n-k)$ (b) $y(n) = \sum_{k=0}^{\infty} x(k)\, h(n-k)$

(c) $y(n) = \sum_{k=-\infty}^{n} x(k)\, h(n-k)$ (d) $y(n) = \sum_{k=0}^{n} x(k)\, h(n-k)$

5. If $x(n) = \{1, 2, 3, 0\}$ and $h(n) = \{3, 1, 0, 0, 0\}$, the length of $y(n) = x(n) * h(n)$ is
(a) 8(b) 7(c) 9(d) none of these

6. $\{1, 2, 3\} * \{3, 2, 1\} =$

(a) {3, 8, 1, 4, 8, 3}(b) {3, 8, 8, 3}(c) {3, 8, 12, 8, 3}(d) {2, 3, 8, 14, 8, 3}

7.

$$\underset{\uparrow}{\{1, 0, 2\}} * \underset{\uparrow}{\{2, 0, 1\}} =$$

(a) $\underset{\uparrow}{\{2,0,5,0,2\}}$ (b) $\underset{\uparrow}{\{2,0,5,0,2\}}$

(c) $\underset{\uparrow}{\{2,0,5,0,2\}}$ (d) $\underset{\uparrow}{\{2,0,5,0,2\}}$

$[x(n) = \{\delta(n+2) - \delta(n) + \delta(n-2)\}] * [h(n) = \{\delta(n) + \delta(n-1)\}]$ is

(a) $\underset{\uparrow}{\{1, 1, -1, -1, 1, 1\}}$ (b) $\underset{\uparrow}{\{1, 1, -1, 1, -1\}}$

(c) $\underset{\uparrow}{\{1, 1, -1, -2, 1, 1\}}$ (d) none of these

9. The convolution of $x(n) = \{1, 2, 0, 0, 0\}$ and $h(n) = \{2, 1, 0\}$ is
(a) {2, 5, 2, 0, 0, 0}(b) {2, 5, 2, 0, 0, 0, 0}(c) {2, 5, 0, 0, 0, 0, 0}(d) {2, 5, 1, 0, 0, 0, 0}

**Answers**

(1) a (2) b (3) c (4) d (5) a (6) a (7) b (8) a (9) b

**Digital Signal Processors**

1. The MACD instruction requires _____ memory accesses per instruction cycle.
2. The cost of an IC increases with the number of _____ in the IC.
3. Extension of number of buses outside the chip would _____ the price.
4. Any operation that involves an off-chip memory is _____ compared to that usingthe on-chip memory in P-DSPs.
5. The P-DSPs use _____ buses only for connecting the on-chip memory to thecontrol unit and data path.
6. The number of memory access per clock period can be increased by using ____ memory or _____ memory.
7. The P-DSPs follow the _____ architecture.
8. Dual port memory is _____ compared to two single port memory of the samecapacity.
9. Some architectures used for P-DSPs are: (i) _____ architecture, (ii) ____ architecture, (iii) ____ architecture, and (iv) _____ architecture.
10. The processing unit consisting of the registers and processing elements such asMAC units,multiplier, ALU, shifter, etc., is also referred to as _____.
11. The throughput will be higher only if the algorithm involves execution of _____ operations.
12. By using 8 functional units, the time required for convolution can be reduced by a _____ factor compared to the case where a single functional unit is used.

13. The efficiency of the P-DSPs can be increased by _____ pipelining.
14. P-DSPs may be implemented using either the _____ processor or _____ processor.
15. In RISC processors _____ of the chip area may be used for the control unit andin CISC processors _____ may be used.
16. RISC has a _____ number of instructions compared to CISC.
17. For P-DSP with _____ architecture, compilers are essential.
18. A majority of P-DSPs are _____ based.
19. Execution of each of the micro instructions is referred to as _____ of an instruction.
20. The number of instructions that are processed simultaneously in the CPU arereferred to as _____ of the instruction pipeline.
21. _____ addressing and _____ addressing modes are specifically tailored forDSP applications.
22. In TI processors, the indirect address registers are called _____ registers.
23. The TMS320C5X is a _____ bit, _____ point processor.
24. The features in which P-DSP is superior to advanced microprocessor is
    (a) low cost(b) low power(c) computational speed(d) real time I/O capability
25. VLIW architecture differs from conventional P-DSP in which of the followingaspects?
    (a) instruction cache(b) number of functional units(c) use pipelining
26. The serial port that permits the data from a number of I/O devices to be sent usinga single serial port is called
    (a) common port(b) Host port(c) time division multiplexing(d) bit I/O port
27. The addressing mode that is convenient for FFT computation is
    (a) indirect addressing(b) circular mode addressing(c) bit reversed addressing(d) memory mapped addressing
28. Which of the following characteristics are true for a RISC processor?
    (a) smaller control unit(b) small instruction set(c) short program length(d) less traffic between CPU and memory

**Answers:**

1. four2. Pins3. Increase4.Slow5. Multiple6.high speed, multiport
7. modified Harvard 8. Costlier9. Von Neumann, Harvard, modified Harvard, VLIW
10. data path11. Independent12.813.Instruction14.RISC, CISC15.20%, 30 to 40% 16.Smaller17.RISC18.CISC19.one phase20. Depth21.cyclic, bit reversed 22. Auxiliary23.16, fixed 24. (d) 25. (b) 26. (c) 27. (c) 28. (b)

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

## EE8691 EMBEDDED SYSTEMS

**Regulation 2017, Even Semester**

**OBJECTIVE TYPE QUESTIONS**

# UNIT I INTRODUCTION TO EMBEDDED SYSTEM DESIGN

## TOPIC 1.1 COMPLEX SYSTEMS AND MICRO PROCESSORS

1. Computer has a built-in system clock that emits millions of regularly spaced electric pulses per_____called clock cycles.
a) second
b) millisecond
c) microsecond
d) minute

***Answer:*** a
***Explanation:*** The regularly spaced electric pulses per second are referred to as the clock cycles. All the jobs performed by the processor are on the basis of clock cycles.

2. It takes one clock cycle to perform a basic operation.
a) True
b) False

***Answer:*** a
***Explanation:*** It takes exactly one clock cycle to perform a basic operation, such as moving a byte of memory from a location to another location in the computer.

3. The operation that does not involves clock cycles is _____
a) Installation of a device
b) Execute
c) Fetch
d) Decode

***Answer:*** a
***Explanation:*** Normally, several clock cycles are required to fetch, execute and decode a particular program.
Installation of a device is done by the system on its own.

4. The number of clock cycles per second is referred as_____
a) Clock speed
b) Clock frequency
c) Clock rate
d) Clock timing

***Answer:*** a
***Explanation:*** The number of clock cycles per second is the clock speed. It is generally measured in gigahertz($10^9$ cycles/sec) or megahertz ($10^6$ cycles/sec).

5. CISC stands for _____
a) Complex Information Sensed CPU
b) Complex Instruction Set Computer
c) Complex Intelligence Sensed CPU
d) Complex Instruction Set CPU

***Answer:*** b
***Explanation:*** CISC is a large instruction set computer. It has variable length instructions. It also has variety of addressing modes.

6. Which of the following processor has a fixed length of instructions?

a) CISC

b) RISC
c) EPIC
d) Multi-core

***Answer:*** b
***Explanation:*** The RISC which stands for Reduced Instruction set computer has a fixed length of instructions. It has a small instruction set. Also has reduced references to memory to retrieve operands.

7. Processor which is complex and expensive to produce is _____
a) RISC
b) EPIC
c) CISC
d) Multi-core

***Answer:*** c
***Explanation:*** CISC stands for complex instruction set computer. It is mostly used in personal computers. It has a large instruction set and a variable length of instructions.

8. The architecture that uses a tighter coupling between the compiler and the processor is _____
a) EPIC
b) Multi-core
c) RISC
d) CISC

***Answer:*** a
***Explanation:*** EPIC stands for Explicitly parallel instruction computing. It has a tighter coupling between the compiler and the processor. It enables the compiler to extract maximum parallelism in the original code.

9. MAR stands for _____
a) Memory address register
b) Main address register
c) Main accessible register
d) Memory accessible register

***Answer:*** a
***Explanation:*** The MAR stands for memory address register. It holds the address of the active memory location.

10. A circuitry that processes that responds to and processes the basic instructions that are required to drive a computer system is _____
a) Memory
b) ALU
c) CU
d) Processor

***Answer:*** d
***Explanation:*** The processor is responsible for processing the basic instructions in order to drive a computer. The primary functions of a processor are fetch, decode and execute.

## TOPIC 1.2 EMBEDDED SYSTEM DESIGN PROCESS

1. Which of the following allows the reuse of the software and the hardware components?
a) platform based design
b) memory design
c) peripheral design
d) input design

***Answer:*** a
***Explanation:*** The platform design allows the reuse of the software and the hardware components in order to cope with the increasing complexity in the design of embedded systems.

2. Which of the following is the design in which both the hardware and software are considered during the design?
a) platform based design
b) memory based design
c) software/hardware codesign
d) peripheral design

***Answer:*** c
***Explanation:*** The software/hardware codesign is the one which having both hardware and software design concerns. This

will help in the right combination of the hardware and the software for the efficient product.

3. What does API stand for?
a) address programming interface
b) application programming interface
c) accessing peripheral through interface
d) address programming interface

***Answer:*** b
***Explanation:*** The platform-based design helps in the reuse of both the hardware and the software components. The application programming interface helps in extending the platform towards software applications.

4. Which activity is concerned with identifying the task at the final embedded systems?
a) high-level transformation
b) compilation
c) scheduling
d) task-level concurrency management

***Answer:*** d
***Explanation:*** There are many design activities associated with the platforms in the embedded system and one such is the task-level concurrency management which helps in identifying the task that needed to be present in the final embedded systems.

5. In which design activity, the loops are interchangeable?
a) compilation
b) scheduling
c) high-level transformation
d) hardware/software partitioning

***Answer:*** c
***Explanation:*** The high-level transformation is responsible for the high optimizing transformations, that is, the loops can be interchanged so that the accesses to array components become more local.

6. Which design activity helps in the transformation of the floating point arithmetic to fixed point arithmetic?
a) high-level transformation
b) scheduling
c) compilation
d) task-level concurrency management

***Answer:*** a
***Explanation:*** The high-level transformation are responsible for the high optimizing transformations, that is, for the loop interchanging and the transformation of the floating point arithmetic to the fixed point arithmetic can be done by the high-level transformation.

7. Which design activity is in charge of mapping operations to hardware?
a) scheduling
b) high-level transformation
c) hardware/software partitioning
d) compilation

***Answer:*** c
***Explanation:*** The hardware/software partitioning is the activity which is in charge of mapping operations to the software or to the hardware.

8. Which of the following is approximated during hardware/software partitioning, during task-level concurrency management?
a) scheduling
b) compilation
c) task-level concurrency management
d) high-level transformation

***Answer:*** a
***Explanation:*** The scheduling is performed in several contexts. It should be approximated with the other design activities like the compilation, hardware/software partitioning, and task-level concurrency management. The scheduling should be precise for the final code.

9. Which of the following is a process of analyzing the set of possible designs?
a) design space exploration
b) scheduling
c) compilation
d) hardware/software partitioning

***Answer:*** a
***Explanation:*** The design space exploration is the process of analyzing the set of designs and the design which meet the specification is selected.

10. Which of the following is a meet-in-the-middle approach?
a) peripheral based design
b) platform based design
c) memory based design
d) processor design

***Answer:*** b
***Explanation:*** The platform is an abstraction layer which covers many possible refinements to a lower level and is mainly follows a meet-in-the-middle approach.

## TOPIC 1.3 DESIGN EXAMPLE: MODEL TRAIN CONTROLLER-DESIGN METHODOLOGIES-DESIGN FLOWS - REQUIREMENT ANALYSIS

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## TOPIC 1.4 SPECIFICATIONS-SYSTEM ANALYSIS AND ARCHITECTURE DESIGN

1. Architectural design is a creative process satisfying only functional-requirements of a system.
a) True
b) False

***Answer:*** b
***Explanation:*** In architectural design you

design a system organization satisfying the functional and non-functional requirements of a system.

2. A_____view shows the system hardware and how software components are distributed across the processors in the system.
a) physical
b) logical
c) process
d) all of the mentioned

***Answer:*** a
***Explanation:*** A physical view is implemented by system engineers implementing the system hardware.

3. The UML was designed for describing _____
a) object-oriented systems
b) architectural design
c) SRS
d) Both object-oriented systems and Architectural design

***Answer:*** d
***Explanation:*** The UML was designed for describing object-oriented systems and, at the architectural design stage, you often want to describe systems at a higher level of abstraction.

4. Which of the following view shows that the system is composed of interacting processes at run time?
a) physical
b) development
c) logical
d) process

***Answer:*** d
***Explanation:*** This view is useful for making judgments about non-functional system characteristics such as performance and availability.

5. Which of the following is an architectural conflict?
a) Using large-grain componentsimproves performance but reduces maintainability
b) Introducing redundant data improves availability but makes security moredifficult
c) Localizing safety-related features usually means more communication so degraded performance
d) All of the mentioned

***Answer:*** d
***Explanation:*** High availability architecture can be affected by several design factors that are required to be maintained to ensure that no single points of failure exist in such design.

6. Which of the following is not included in Architectural design decisions?
a) type of application
b) distribution of the system
c) architectural styles
d) testing the system

***Answer:*** d
***Explanation:*** Architectural design decisions include decisions on the type of application, the distribution of the system, the architectural styles to be used, and the ways in which the architecture should be documented and evaluated.

7. Architecture once established can be applied to other products as well.
a) True
b) False

***Answer:*** b
***Explanation:*** Systems in the same domain often have similar architectures that reflect domain concepts.

8. Which of the following pattern is the basis of interaction management in many web-based systems?
a) architecture
b) repository pattern

c) model-view-controller
d) different operatingsystem

***Answer:*** c
***Explanation:*** Model-View-Controller pattern is the basis of interaction management in many web-based systems.

9. What describes how a set of interacting components can share data?
a) model-view-controller
b) architecture pattern
c) repository pattern
d) none of the mentioned

***Answer:*** c
***Explanation:*** The majority of systems that use large amounts of data are organized around a shared database or repository.

10. Which view in architectural design shows the key abstractions in the system as objects or object classes?
a) physical
b) development
c) logical
d) process

***Answer:*** c
***Explanation:*** It is possible to relate the system requirements to entities in a logical view.

11. Which of the following is a type of Architectural Model?
a) Static structural model
b) Dynamic process model
c) Distribution model
d) All of the mentioned

***Answer:*** d
***Explanation:*** All these models reflects the basic strategy that is used to structure a system.

## DESIGNING WITH COMPUTING PLATFORMS

1. Which of the following is not included in failure costs?
a) rework
b) repair
c) failure mode analysis
d) none of the mentioned

***Answer:*** d
***Explanation:*** Failure costs are those that would disappear if no defects appeared before shipping a product to customers.

2. Which requirements are the foundation from which quality is measured?
a) Hardware
b) Software
c) Programmers
d) None of the mentioned

***Answer:*** b
***Explanation:*** Lack of conformance to requirements is lack of quality.

3. Which of the following is not a SQA plan for a project?
a) evaluations to be performed
b) amount of technical work
c) audits and reviews to be performed
d) documents to be produced by the SQA group

***Answer:*** b
***Explanation:*** All other options support a SQA plan.

4. Degree to which design specifications are followed in manufacturing the product is called
a) Quality Control
b) Quality of conformance
c) Quality Assurance
d) None of the mentioned

***Answer:*** b

**Department of Electrical and Electronics Engineering**
**Odd Semester, Reg-2017**

## High Voltage Engineering

### Multiple Choice Questions (MCQ)

| Sr. No | Question | | |
|---|---|---|---|
| 1 | Dielectric strength in case of mica can be expected to be more than | | |
| A : 500 kV/mm | B : 1500 kV/mm | C : 2500 kV/mm | D : 3500 kV/mm |
| 2 | All of the following dielectric materials are preferred for high frequency applications EXCEPT | | |
| A : Polyethylene | B : Butyl rubber | C : Teflon | D : Polystyrene |
| 3 | Polar dielectrics are normally used for | | |
| A : high frequencies | B : microwaves | C : dc and power frequencies | D : none of the above |
| 4 | The impurity in liquid dielectric which has significant effect in reducing the breakdown strength, is | | |
| A : dust | B : dissolved gases | C : moisture | D : ionic impurities |
| 5 | The relationship between the breakdown voltage V and gap d is normally given as | | |
| A : $d = kV^2$ | B : $d=kV^3$ | C : $V=kd$ | D : $V=kd^n$ |
| 6 | A good dielectric should have all the following properties EXCEPT | | |
| A : high mechanical strength | B : high resistance to thermal deterioration | C : high dielectric loss | D : freedom from gaseous inclusions |
| 7 | The variety of paper used for insulation purpose is | | |
| A : blotting paper | B : rice paper | C : craft paper | D : mill-board |
| 8 | Corona effect can be identified by | | |
| A : bushy sparks | B : faint violet glow | C : red light | D : arcing between conductors and earth |
| 9 | The phenomenon of corona is generally accompanied by | | |
| A : a bang | B : a hissing sound | C : magnetic hum | D : all of the above |
| 10 | Van de Graaff generators are useful for | | |
| A : Very high voltage and low current applications | B : Very high voltage and high current applications | C : Constant high voltage and current applications | D : High voltage pulses only |

| Multiple Choice Questions (MCQ) | | | |
|---|---|---|---|
| Sr. No | Question | | |
| 11 | In Van de Graaff generators output voltage is controlled by | | |
| A : controlling the corona source voltage | B : controlling the belt speed | C : controlling the lower spray point | D : any of the above |
| 12 | A Tesla coil is a | | |
| A : cascaded transformer | B : coreless transformer | C : high frequency resonant transformer | D : low impedance transformer |
| 13 | Switching surge is | | |
| A : high voltage dc | B : high voltage ac | C : short duration transient voltage | D : hyperbolically dying voltage |
| 14 | Insulators for high voltage applications are tested for | | |
| A : power frequency tests | B : impulse tests | C : both (A) and (B) above | D : none of the above |
| 15 | Transformers contribute to radio interference due to | | |
| A : corona discharges in air | B : internal or partial discharges in insulation | C : sparking | D : any of the above |
| 16 | The electrical breakdown strength of insulating materials depends on | | |
| A : nature of applied voltage | B : imperfections in dielectric material | C : pressure, temperature and humidity | D all of the above: |
| 17 | Which of the following gas has been used as insulating medium in electrical appliances ? | | |

| | | | |
|---|---|---|---|
| A : Nitrogen | B : Carbon dioxide | C : Sulphur hexafluoride | D : Freon |
| 18 | Liquids are generally used as insulating materials up to voltage stresses of About | | |
| A : 100 MV/cm | B : 50 MV/cm | C : 50 kV/cm | D : 500 V/cm |
| 19 | Electro-mechanical breakdown of solid insulating materials occurs due to | | |
| A : magnetic bum | B : vibrations | C : mechanical stresses produced by the electrical field | D : electrical stresses produced by the voltage fluctuations |
| 20 | Surge voltage originate in power systems due to | | |
| A : lightning | B : switching operations | C : faults | D : any of the above |

| Multiple Choice Questions (MCQ) | | | |
|---|---|---|---|
| Sr. No | Question | | |
| 21 | Corona results in | | |
| A : improvement in power factor | B : increased capacitive reactance of transmission lines | C : radio interference | D : better regulation |
| 22 | Which of the following method or technique can be used for the measurement of high dc voltages? | | |
| A : Generating voltmeter | B : Electrostatic voltmeter | C : Peak voltmeter | D : Any of the above |
| 23 | All of the following methods/techniques can be used for the measurement of high ac voltages EXCEPT | | |
| A : Potential dividers | B : Potential transformers | C : Electrostatic voltmeters | D : Half effect generators |
| 24 | Surge diverters are | | |
| A : non-linear resistors in series with spark gaps which act as fast switches | B : arc quenching devices | C : shunt reactors to limit the voltage rise due to Ferranti effect | D : over-voltages of power frequency harmonics |
| 25 | Impulse voltages are characterized by | | |
| A : polarity | B : peak value | C : time of half the peak value | D : all of the above |
| 26 | Paschen's law is associated with | | |
| A : breakdown voltage | B : ionization | C : thermal radiations | D : none of the above |
| 27 | The essential condition for the Paschen's law to be valid is that | | |
| A : voltage must be dc | B : voltage must be ac | C : temperature must be constant | D : humidity must be low |
| 28 | The breakdown voltage in gases depends on | | |
| A : distance between the electrodes | B : relative air density | C : humidity | D : all of the above |
| 29 | At unvarying temperature breakdown voltage in a uniform field is a function of the product of gas pressure and distance between the electrodes. The above statement is known as | | |
| A : Electron avalanche | B : Thermal stability principle | C : Paschen's law | D : Breakdown voltage law |

| | | | |
|---|---|---|---|
| 30 | Large capacity generators are manufactured to generate power at | | |
| A : 440 V | B : 6.3 to 10.5 kV | C : 132 kV to 220 kV | D : 400 kV |
| 31 | In sphere gaps, the sphere are made of | | |
| A : aluminium | B : brass | C : bronze | D : any of the above |
| 32 | In 'plasma' state a gas | | |
| A : loses electrical conductivity | B : conducts electricity | C : becomes perfect insulator | D : attracts moisture |
| 33 | Which of the following statement about corona is incorrect? | | |
| A : Corona gives rise to radio interference | B : Corona results in loss of power in transmission | C : Corona discharge can be observed as red luminescence | D : Corona is always accompanied by a hissing noise |
| 34 | Which variety of mica is hard and brittle? | | |
| A : Muscovite | B : Phlogopite | C : Fibiolite | D : Lipidolite |
| 35 | Moles bridge is used to measure | | |
| A : properties of dielectric at dc | B : dispersion in insulation | C : high frequency high voltages | D : modulation ratio frequencies |

| Multiple Choice Questions (MCQ) ANSWERS | | | | | |
|---|---|---|---|---|---|
| Que. No. | Answer | Que. No. | Answer | Que. No. | Answer |
| 1 | A | 13 | C | 25 | D |
| 2 | B | 14 | C | 26 | A |
| 3 | C | 15 | D | 27 | C |
| 4 | C | 16 | D | 28 | D |
| 5 | D | 17 | C | 29 | C |
| 6 | C | 18 | C | 30 | B |
| 7 | C | 19 | C | 31 | D |
| 8 | B | 20 | D | 32 | B |
| 9 | B | 21 | C | 33 | C |
| 10 | A | 22 | A | 34 | D |
| 11 | A | 23 | D | 35 | B |
| 12 | C | 24 | A | | |

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

## EE 8702 – Power System Operation and Control

## Regulation 2017, Odd Semester

## Multiple Choice Questions

FILL UP THE BANKS:

UNIT-1

1. The frequency of the power system controls the_____.
2. Single control area fitted with proportional plus integral controller is_____.
3. The synchronizing coefficient between two area of a 2 area power system is_____.
4. If the two generators have individual ratings of 10MW each & a system load of 16 MW should be share as_____.
5. Load frequency control uses_____.

UNIT-2

1. The specified variables at PQ buses are_____.
2. In case of transmission line the capacitance is a_____.
3. Series Capacitors are used to_____.
4. Synchronous motor can operate at_____.
5. Under heavy loading condition , the reeceving end bus should be_____.

UNIT-III:

1. The unit of heat rate is_____.
2. The unit of langrangian multiplier Ƭ is_____.
3. For a slack bus ,the penalty factor is_____.
4. Incremental transmission loss of grid is_____.
5. IFC is given by_____.

UNIT-IV:

1. The constraint equation in computing economic criteria is given by_____.
2. The units can be started within a short duration of time to meet the change in load when a particular unit fails in the power system is called_____.
3. The constraints placed on the system operation by reliability considerations the system will be operated most_____.
4. The unit is running it should not be turned off immediately this is called as_____5.. What are the methods of finding economic dispatch_____.

UNIT-V:

1. Define SCADA_____.
2. Application of SCADA reduce_____.
3. State estimation uses techniques like_____.
4. State the functions of energy control center_____.
5. State the functions of load dispatch center_____.

MULTIPLE CHOICE QUESTIONS: UNIT-1

1. In load flow analysis, the load connected at a bus is represented as ( )
    a. Constant current drawn from the bus
    b. Constant impedance connected at the bus
    c. Voltage and frequency dependent source at the bus
    d. Constant real and reactive drawn from the bus

Ans c

2. Two power plants A and B are inter connected by a ( )
    a. Long line b.short line c.both d.none

Ans d

3. In the single area case we could thus represent the frequency deviations by the ( )
    a. Single variable b.two variable
    b. Three variable d.four variable

Ans.a

3. Power transmitted from the area 1 is equation ( )
    a. A.power equation b.torque
    b. C.current d.all

Ans.a

4. All quantities other than frequency are in ( )
    a.p.u b.apm d.volt d.ohm

Ans.a

UNIT-2

1.. Shunt capacitors ( )
    a. Fixed capacitor is connected across a load
    b. At a consumers premises c. both d. none

Ans.c

3. An excitation system should have ( )
    a. Low time constant b. high transient response c. high reliability d. all the above

Ans.d

4. A power system needs injection of VARS ( )
    a. At peak load b. at off-peak load c. both (a) & (b) none

Ans.c

5. The change in reactive power at a bus have a great effect on the voltage magnitude ( )
    a. Of that bus b. of distant busses c. of all the busses d. none

Ans.a

5. The injection of reactive power is needed ( )
    a. To get a good voltage profile b. to increase the voltage at the receiving end
    b. To compensate for line losses. D. to supply a part of active power requirement of the load.

c. Ans.a

UNIT-3

1. Equality constraints are ( )
   a. Generator constrains b. Current constraints
   b. Magnetic constraints d. none of the above

   Ans a
2. Heat rate curve is defined as ( )
   a. Fuel i/p to the power o/p b.Power o/p to the fuel i/p
   b. Both d.none of the above

   Ans a
3. Optimal operation of generator is ( )
   a.To maximize the total cost b.To minimize the total cost
   d. Both d.all the above

   Ans c
4. The fuel cost is included in ( )
   a. Annual fived cost b. Annual operating cost c.. Both (a) & (b) d. None Ans.b
5. The penalty factor ( )
   a. Is always less than 1. B.is always more than 1 c. may be more or less than 1.
   D. isequal to 1 or less than 1.

   Ans .b

UNIT -4

1. Operation of the system the having ( )

a. Hydro b.Thermal c.both d.none

Ans.c

2. The hydroelectric project consists of ( )
   a. Body of water impounded by a dam b. body of water impounded by a station
   c.both d.All of the above

   Ans.a
3. The water level bay is influenced by flow out of the ( )
   a.reservoir b.dam
   c.hydroplant d.none

   Ans: b
4. The run off river plants have very high firm capacity ( )
   a. True b. False

   Ans.b
5. The units for heat rate are ( )
   a. K cal/kwh b.kwh/k cal c.k cal/hour d.kw

   Ans.a

UNIT -5

1. Electrical energy can be stored in large amounts False
2. Load forecasting is done only for long term. False
3. Application of SCADA reduce man power requirement. True 4. SCADA is used only by utilities and not in any industry. False.
4. State estimation uses techniques like weighted least square method. True

GATE:

1. The fuel cost functions of two power plants are

Where, Pg1 and Pg2 are the generated powers of two plants, and A and B are the constants. If the two plants optimally share 1000 MW load at incremental fuel cost of 100 Rs/MWh, the ratio of load shared by plants P1 and P2 is (A) 1:4 (B) 2:3 (C) 3:2 (D) 4:1

2. A 50 Hz generating unit has H-constant of 2 MJ/MVA. The machine is initially operating in steady state at synchronous speed, and producing 1 pu of real power. The initial value of the rotor angle δ is ? 5 , when a bolted three phase to ground short circuit fault occurs at the terminal of the generator. Assuming the input mechanical power to remain at 1 pu, the value of δ in degrees, 0.02 second after the fault is_____..

3. A load center of 120MW derives power from two power stations connected by 220kV transmission lines of 25km and 75km as shown in the figure below. The three generators G1,G2 and G3 are of 100MW capacity each and have identical fuel cost characteristics. The minimum loss generation schedule for supplying the 120 MW load is

(A).P1 80MW losses P2 20MW P3 20MW (B) P1 60MW P2 30MW losses P3 30MW

© P1 40MW P2 40MW P3 40MW losses (D) P1 30MW losses P2 45MW P3 45MW

Sub Code: ROE086

**Paper Id XXXXXX** Roll No: | | | | | | | | | | | | | |

**RENEWABLE ENERGY RESOURCES-EE8703**
**Odd Semester, Regulation-2017**

***Time: 2 Hours*** ***Total Marks: 70***

*Note: Attempt all questions. The question paper contains 70 MCQ type questions. Each question carries equal marks. Select the answer and fill the appropriate bubble corresponding to that question in the attached OMR sheet.*

| Q no. | Question |
|---|---|
| 1 | Which of the following is a disadvantage of renewable energy<br>a. High pollution<br>b. Available only in few places<br>c. High running cost<br>d. Unreliable supply |
| 2 | A Solar cell is an electrical device that converts the energy of light directly into electricity by the<br>a. Photovoltaic effect<br>b. Chemical effect<br>c. Atmospheric effect<br>d. Physical effect |
| 3 | In hydroelectric power, what is necessary for the production of power throughout the year<br>.a, Dams filled with water<br>b. High amount of air<br>c. High intense sunlight<br>d. Nuclear power |
| 4 | The main composition of biogas is<br>a. Methane<br>b. Carbon dioxide<br>c. Nitrogen<br>d. Hydrogen |
| 5 | Which Ministry is mainly responsible for research and development in renewable energy sources such as wind power, small hydro, biogas and solar power?<br>a. Human Resource Development<br>b. Agriculture and Farmers Welfare<br>c. Ministry of New and Renewable Energy<br>d. Health and Family Welfare |
| 6 | Which among the following have a large amount of installed grid interactive renewable power capacity in India<br>a. Wind power<br>b. Solar power<br>c. Biomass power<br>d. Small Hydro power |
| 7 | The world's first 100% solar powered airport located at<br>a. Cochin, Kerala<br>b. Bengaluru, Karnataka<br>c. Chennai, Tamil Nadu<br>d. Mumbai, Maharashtra |
| 8 | Which of the following is not under the Ministry of New and Renewable Energy |

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**Paper Id XXXXXX** Roll No: | | | | | | | | | | | | | |

| | |
|---|---|
| | a. Wind energy<br>b. Solar energy<br>c. Tidal energy<br>d. Large hydro power energy |
| 9 | . Where is the largest Wind Farm located in India<br>a. Jaisalmer Wind Park, Rajasthan<br>b. Muppandal Wind Farm, Tamil Nadu<br>c. Vaspet Wind Farm, Maharashtra<br>d. Chakala Wind Farm, Maharashtra |
| 10 | Which Indian enterprise has the Motto "ENERGY FOREVER"<br>a. Indian Renewable Energy Development Agency<br>b. Indian Non-Renewable Energy Development<br>c. Indian Agricultural Development<br>d. Indian Biotechnology Development |
| 11 | Which of the following is (are) renewable resource(s)<br>a. wind<br>b. tides<br>c. geothermal heat<br>d. all of the above |
| 12 | Which of the following country generate all their electricity using renewable energy<br>a. Iceland<br>b. England<br>c. USA<br>d. China |
| 13 | Renewable energy often displaces conventional fuel in which of the following area<br>a. space heating<br>b. transportation<br>c. electricity generation<br>d. all of the above |
| 14 | Which of the following is used as fuel for transportation<br>a. ethanol<br>b. aldehyde<br>c. ketone<br>d. all of the above |
| 15 | Biodiesel is produced from oils or fats using<br>a. fermentation<br>b. transesterification<br>c. distillation<br>d. none of the above |
| 16 | Photovoltaic cell converts solar energy into<br>a. heat energy<br>b. electric energy<br>c. mechanical energy<br>d. chemical energy |

| | |
|---|---|
| 17 | In which of the following region winds are stronger and constant<br>a. deserts<br>b. offshore<br>c. low altitudes sites<br>d. all of the above |
| 18 | Following country met more than 40% of its electricity demand from wind energy<br>a. Denmark<br>b. Portugal<br>c. Ireland<br>d. Spain |
| 19 | Concentrated solar power (CSP) systems use_____to focus a large area of sunlight into a small beam<br>a. lenses<br>b. mirrors<br>c. tracking systems<br>d. all of the above |
| 20 | The difference, in temperature between the core of the planet and its surface, is known as<br>a. geothermal coefficient<br>b. geothermal gradient<br>c. geothermal constant<br>d. none of the above |
| 21 | Direct Solar energy is used for<br>a. Water heating<br>b. Distillation<br>c. Drying<br>d. All of the above |
| 22 | The following is indirect method of Solar energy utilization<br>a. Wind energy<br>b. Biomass energy<br>c. Wave energy<br>d. All of the above |
| 23 | The hour angle is equivalent to<br>a. 10° per hour<br>b. 15° per hour<br>c. 20° per hour<br>d. 25° per hour |
| 24 | The following is (are) laws of black body radiation.<br>a. Plank's law<br>b. Stefan-Boltzmann law<br>c. both (A) and (B)<br>d. None of the above |
| 25 | Beam radiations are measured with<br>a. Anemometer<br>b. Pyrheliometer<br>c. Sunshine recorder<br>d. All of the above |
| 26 | The function of a solar collector is to convert..... |

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**Paper Id XXXXXX** Roll No: | | | | | | | | | | | | | |

| | |
|---|---|
| | a. Solar Energy into Electricity<br>b. Solar Energy radiation<br>c. Solar Energy thermal energy<br>d. Solar Energy mechanical energy |
| 27 | Most of the solar radiation received on earth surface lies within the range of.....<br>a. 0.2 to 0.4 microns<br>b. 0.38 to 0.78 microns<br>c. 0 to 0.38 microns<br>d. .5 to 0.8 microns |
| 28 | For satellite the source of energy is.....<br>a. Acrogenic storage<br>b. Battery<br>c. Solar cell<br>a. Any of the above |
| 29 | Reflecting mirrors used for exploiting solar energy are called.....<br>a. Mantle<br>b. Ponds<br>c. Diffusers<br>d. Heliostats |
| 30 | What does Heating and cooling of the atmosphere generates<br>a. Thermo line circulation<br>b. Radiation currents<br>c. Convection currents<br>d. Conduction currents |
| 31 | How much wind power does India hold<br>a. 20,000 MW<br>b. 12,000 MW<br>c. 140,000 MW<br>d. 5000 MW |
| 32 | What is the main source for the formation of wind<br>a. Uneven land<br>b. Sun<br>c. Vegetation<br>d. Seasons |
| 33 | . Which country created wind mills<br>a. Egypt<br>b. Mongolia<br>c. Iran<br>d. Japan |
| 34 | What happens when the land near the earth's equator is heated?<br>a. All the oceans gets heated up<br>b. Small wind currents are formed<br>c. Rise in tides<br>d. Large atmospheric winds are created |
| 35 | What type of energy is wind energy?<br>a. Renewable energy |

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**Paper Id XXXXXX** Roll No: | | | | | | | | | | | | | |

| | |
|---|---|
| | b. Non-renewable energy<br>c. Conventional energy<br>d. Commercial energy |
| 36 | . What are used to turn wind energy into electrical energy?<br>a. Turbine<br>b. Generators<br>c. Yaw motor<br>d. Blades |
| 37 | A solar cell is a<br>a. P-type semiconductor<br>b. N-type semiconductor<br>c. Intrinsic semiconductor<br>d. P-N Junction |
| 38 | Which of the following materials cannot be used as solar cells materials?<br>a. Si<br>b. GaAs<br>c. CdS<br>d. PbS |
| 39 | What is the difference between Photodiode and Solar cell?<br>a. No External Bias in Photodiode<br>b. No External Bias in Solar cell<br>c. Larger surface area in photodiode<br>d. No difference |
| 40 | During the collection of e-h pairs, holes are collected by<br>a. Front contact<br>b. Back contact<br>c. Si-wafer<br>d. Finger electrodes |
| 41 | . Fuel cell converts chemical energy to electrical energy using a reaction that<br>a. Eliminates combustion of fuel<br>b. Requires combustion of fuel<br>c. Requires no ignition of fuel<br>d. fuel is not required |
| 42 | . Fuel cell performance is not limited by<br>a. First law of Thermodynamics<br>b. Second law of Thermodynamics<br>c. Third law of Thermodynamics<br>d. All three laws are applicable |
| 43 | For which of these devices does a negative charge carrier flow from anode to cathode in the external circuit?<br>a. MHD generator<br>b. Thermionic generator<br>c. Thermoelectric generator<br>d. Fuel cell |

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| | |
|---|---|
| 44 | The type of reactions in a fuel cell is not determined by<br>a. Fuel and oxidizer combination<br>b. Composition of electrolyte<br>c. Materials of anode and cathode<br>d. catalytic effects of reaction container |
| 45 | Which of these gases or liquids are not used as source of hydrogen in fuel cells?<br>a. C2H6<br>b. C2H2<br>c. C6H6<br>d. C2H5OH |
| 46 | Which of these should not be properties of fuel cell electrodes?<br>a. Good electrical conductors<br>b. Highly resistant to corrosive environment<br>c. Should perform charge separation<br>d. take part in chemical reactions |
| 47 | The process of producing energy by utilizing heat trapped inside the earth surface is called<br>a. Hydrothermal energy<br>b. Geo-Thermal energy<br>c. Solar energy<br>d. Wave energy |
| 48 | How much is the average temperature at depth of 10 km of earth surface?<br>a. 200 $^{o}$C<br>b. 900 $^{o}$C<br>c. 650 $^{o}$C<br>d. 20 $^{o}$C |
| 49 | What is hot molten rock called?<br>a. Lava<br>b. Magma<br>c. Igneous rocks<br>d. Volcano |
| 50 | How many kinds of Geo thermal steams are there?<br>a. 2<br>b. 3<br>c. 4<br>d. 5 |
| 51 | What does EGS stand for in geothermal energy?<br>a. Engraved Geothermal systems<br>b. Enhanced geothermal system<br>c. Exhaust gas system<br>d. Engineered geo physical system |
| 52 | Earth's outer layer rock is called as<br>a. Mantle<br>b. Crust<br>c. Outer core<br>d. Asthenosphere |
| 53 | The hole on earth's surface from where the steam from the earth comes out is called as<br>a. Gash<br>b. Mud pot<br>c. Void |

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**Paper Id XXXXXX** Roll No: | | | | | | | | | | | | | |

| | |
|---|---|
| | d. Fumaroles |
| 54 | Which kind geothermal plant is most common type?<br>a. Dry steam<br>b. Flash<br>c. Binary<br>d. Wet steam |
| 55 | How much is the efficiency of geothermal plant?<br>a. 28%<br>b. 15%<br>c. 42%<br>d. 30% |
| 56 | Which of the following liquid metal is not used as a magneto hydrodynamic generation (MHD) working fluid?<br>a. Potassium<br>b. Sodium<br>c. Lithium<br>d. All of these. |
| 57 | Coal is processed and burnt in the combustor of a hybrid MHD at a high temperature and pressure with the preheated air to form which among the following element?<br>a. Steam<br>b. Plasma<br>c. Coke<br>d. None of these. |
| 58 | What is the working fluid in closed cycle MHD system?<br>a. Helium and argon<br>b. Coal<br>c. Natural gas<br>d. Potassium |
| 59 | The ocean thermal energy conversion(OTEC) is uses<br>a. Energy difference<br>b. Potential difference<br>c. Temperature difference<br>d. Kinetic difference |
| 60 | The by-product of the ocean thermal energy conversion is<br>a. Hot water<br>b. Cold water<br>c. Chemicals<br>d. Gases |
| 61 | How many types of OTEC plants are there?<br>a. 1<br>b. 2<br>c. 3<br>d. 4 |
| 62 | Closed cycle systems use the fluid having<br>a. High boiling points<br>b. Low boiling points<br>c. High viscosity<br>d. low viscosity |

| | |
|---|---|
| 63 | Warm surface sea water is pumped through a_____to vaporise the fluid.<br>a. Heat exchanger<br>b. Generator<br>c. Evaporator<br>d. Condenser |
| 64 | The steam leaves the<br>a. Salts<br>b. Aluminium<br>c. Copper<br>d. Silver |
| 65 | The open cycle system produces_____water.<br>a. Desalinated<br>b. Impure<br>c. Contaminated<br>d. Chlorinated |
| 66 | Tidal energy is a form of<br>a. Wind power<br>b. Solar power<br>c. Heat energy<br>d. Hydro power |
| 67 | Tidal energy has_____for future electricity generation.<br>a. Kinetic energy<br>b. Potential<br>c. Wind power<br>d. Solar power |
| 68 | Which of the following is the best form of energy that can be used at any time?<br>a. Wind energy<br>b. Solar energy<br>c. Tidal energy<br>d. Heat energy |
| 69 | The oceanic tides are due to<br>a. Heavy Winds<br>b. Slight earth quakes<br>c. Water force<br>d. Gravitational interaction |
| 70 | Tidal power is practically<br>a. Exhaustible<br>b. Inexhaustible<br>c. Not possible<br>d. Complicated |

Sub Code: KMB402/KMT402

**Paper Id XXXXXX** Roll No: | | | | | | | | | | | | | |

**MBA/MBTM**
**(SEM IV) THEORY EXAMINATION 2019-20**
**ENTREPRENEURSHIP DEVELOPMENT**

***Time: 2 Hours*** ***Total Marks: 100***

*Note: Attempt all questions. The question paper contains 80 MCQ type questions. Each question carries equal marks. Select the answer and fill the appropriate bubble corresponding to that question in the OMR sheet provided.*

| Q no. | Question |
|---|---|

1. Who has defined 'Entrepreneur as an innovator'?
   a. J. B. Say
   b. J. Schumpeter
   c. Adam Smith
   d. Peter Drucker
2. The process to create value through recognition of business opportunities is called-
   a. Intrapreneurship
   b. Entrepreneurship
   c. Leadership
   d. None of these
3. Who has recognized entrepreneurship as a process of creative destruction?
   a. J. B. Say
   b. Richard Cantillion
   c. J. Schumpeter
   d. Adam Smith
4. An Individual who is employee of a company and is in charge of an identifiable activity is called-
   a. Ecopreneur
   b. Technopreneur
   c. Entrepreneur
   d. Intrapreneur
5. Nirma detergent was introduced to meet the demand of lower income group. It comes under which function of Entrepreneur?
   a. Recognizing opportunities
   b. Arranging resources
   c. Supply of capital
   d. All of the above
6. Which one is not correct regarding emergence of women entrepreneurship in India?
   a. Awakening of the society
   b. Gender inequality
   c. Institutional support to women
   d. All of the above
7. Which of the following is not a risk assumed by an entrepreneur?
   a. Financial risk

b. market risk
c. Production Risk
d. None of the above

8. are characterized by adopting the successful innovations of others.
   a. Drone entrepreneurs
   b. Imitative entrepreneurs
   c. Trading entrepreneurs
   d. Fabian entrepreneurs
9. These entrepreneurs are lazy and shy and lack the will to adopt new methods.
   a. Drone entrepreneurs
   b. Imitative entrepreneurs
   c. Trading entrepreneurs
   d. Fabian entrepreneurs
10. Entrepreneurship based on the inheritance is called:
   a. Social entrepreneurship
   b. Rural entrepreneurship
   c. Family entrepreneurship
   d. Professional entrepreneurship

11. These entrepreneurs undertake trading and do not engage in manufacturing are called:
   a. Drone entrepreneurs
   b. Imitative entrepreneurs
   c. Trading entrepreneurs
   d. Fabian entrepreneurs
12. Which of the following is not a challenge for Social entrepreneurs in India?
   a. Inadequate finance
   b. Old techniques
   c. Imperfect management
   d. Achievement orientation
13. Which of the following is problem of women entrepreneurship in India?
   a. Male dominated
   b. Social barriers
   c. Lack of Information
   d. All of the above
14. Which of the following favors Women entrepreneurship?
   a. Individual vision
   b. Government support
   c. self actualization
   d. All of the above.
15. ICICI was set up in which year?
   a. 1964
   b. 1994
   c. 1977
   d. 1982
16. Which is not the challenge of women entrepreneurship in India?
   a. Government Support
   b. family conflicts

c. social acceptance
d. Availability of finance

17. Debenture is concerned with:
    a. Acknowledgement of debt by a company
    b. New project of high technology
    c. New project having high risk
    d. All the above.
18. Which one is served by a good business plan ?
    a. Helps entrepreneurs to raise the funds.
    b. Can help to organize of the venture.
    c. Provides a blueprints for business activities.
    d. All the above.
19. Which of the following is the most important objective of Entrepreneurial development?
    a. Shareholders Value
    b. increase in profits
    c. Economic development
    d. business development
20. Reduction in the value of asset is known as:
    a. Depreciation
    b. Appreciation
    c. reduction of cost
    d. None
21. Which of these statements best describes the feasibility study?
    a. It provides a basis for investment decision.
    b. It examines the viability of a product.
    c. It gives details on market and finance
    d. All of the above
22. It is an in depth analysis of the project after feasibility analysis. What is it?
    a. Project plan
    b. Market plan
    c. Project Appraisal
    d. None of theses
23. Which of the following is the subsidiary of IDBI?
    a. ICICI
    b. IFCI.
    c. SIDBI
    d. SFC
24. NIESBUD was set up in which year?
    a. 1984.
    b. 1988.
    c. 1988.
    d. 1991
25. Which of the following is used to complete the project in the minimum available time with limited resources

a. Network Analysis.
b. Budget Analysis.
c. Project Scheduling.
d. Critical analysis.

26. Which form of financing especially for funding first generation entreprepreneurs, governed by SEBI and perceived high reward projects?
    a. Fixed capital.
    b. Current capital.
    c. Venture capital
    d. Debenture.
27. Which of the following is correct for the approach of generating ideas?
    a. Brainstorming
    b. Market research
    c. Conferences and seminars
    d. All of the above
28. What is the meaning of feasibility study?
    a. Whether ideas will work or not
    b. Demand assessment
    c. Technology assessment
    d. All of the above
29. PepsiCo entry in India is an example of which force of environment?
    a. Social
    b. Politico-legal
    c. Economic
    d. Technological
30. Who has given five forces analysis?
    a. Ricardo.
    b. J. Schumpeter
    c. Michael Porter
    d. None of these
31. Which of the following factors should not be included in PESTLE analysis?
    a. Government re-cycling policy
    b. Reduction in interest rates
    c. Competitor activity.
    d. None
32. Which of the following is the analysis of costs and benefits of a proposed project with the goal of assuming a rational allocation of limited funds?
    A. Project formulation.
    B. Project appraisal.
    C. Project evaluation.
    D. Project Design.
33. The document gives a comprehensive picture of the entire business plan is called-

a. Executive summary
b. Research article
c. Business Plan
d. None of these

34. Which industrial sector promotes small-scale businesses and Entrepreneurship, and has lower barriers to market entry?
    a. service
    b. Manufacturing
    c. Agriculture
    d. Logistics
35. A feasibility study of a project contains following aspect.
    a. Technical
    b. Commercial
    c. Financial
    d. All of the above
36. Why are small businesses important to a country's economy?
    a. Promote entrepreneurship
    b. Good for economy
    c. Innovators of new products
    d. All of the above
37. A key aspect of the Production section of the business plan is_____.
    a. A statement of management skills.
    b. Realistic sales forecast.
    c. Production capacity.
    d. A description of competitors.
38. To provide financial assistance to entrepreneurs the government has set up a number of_____.
    a. Financial advisors.
    b. Financial agents.
    c. Financial Institutions.
    d. Financial analyst.
39. In which type of business ownership the interest cannot be transferred by one person?
    a. Public enterprise
    b. Partnership firm
    c. joint stock company
    d. sole proprietorship
40. The process by which an entrepreneur monitors the relevant environment to identify strength and weakness is called:-
    a. Idea generation
    b. Environmental scanning
    c. Environmental filtration
    d. Environmental tapping

Sub Code: KMB402/KMT402

**Paper Id XXXXXX** Roll No: | | | | | | | | | | | | | |

41. IFCI has been converted into a_____.
    a. Public enterprise
    b. Partnership firm
    c. joint stock company
    d. sole proprietorship
42. Which of the following is Micro environmental factor?
    a. Economic
    b. customer
    c. Political
    d. All of the above
43. Increasing trend of online retailing is an example of which environment?
    a. Economic
    b. Political
    c. Technological
    d. Cultural
44. _____can be defined as a specifically evolved work plan densed to achieve a specific objective within a specific period of time.
    a. Market survey
    b. Executive summary
    c. Project
    d. strategy
45. _____is the expenses incurred on the setting up of the enterprise.
    a. Cost of promotion
    b. Cost of financing
    c. Cost of fixed assets.
    d. Cost of current assets.
46. A private corporation means_____.
    a. A company can be started by only two members.
    b. Government Company.
    c. Statutory corporation.
    d. Department of union government
47. Social entrepreneur is a person who_____.
    a. takes part in the incorporation of a company .
    b. is a director.
    c. is a relative of the managing director.
    d. works to enhance living standard of the society.

48. 'Personal Touch' is the property of which type of business firm?
    a. Sole-proprietorship.
    b. Partnership.
    c. Joint hindu family firm
    d. co-operative societies
49. 'Agency relation' is the property of which type of business firm?
    a. Sole-proprietorship.

b. Partnership.
c. Joint hindu family firm
d. co-operative societies

50. The term 'Internal vitality' is used in relation to_____.
a. Sole-proprietorship.
b. Partnership.
c. Joint stock companies.
d. co-operative societies

51. 'Open Membership' is the characteristic of which type of organization?
a. Sole-proprietorship.
b. Partnership.
c. Joint hindu family firm
d. co-operative societies

52. Which is the merit of co-operative organization?
a. Misuse of funds
b. Democratic funding
c. Limited capital
d. Lack of managerial skill

53. Which of the following source is owner's source of finance?
a. Equity shares.
b. Debentures.
c. Loans from banks.
d. Public deposits.

54. _____is a problem -solving technique designed to produce numerous ideas in a short period.
a. Synectics
b. Delphi Method
c. Focus group
d. Brainstorming

55. The 'T' in a PESTLE analysis refers to_____.
a. Time
b. Training
c. Technology
d. Talent

56. Which of the following securities proves a burden on finances of the company, when company is not earning profits?
a. Equity shares.
b. Debentures
c. Redeemable preference shares.
d. Preference shares.

57. Which cost is estimated on the basis of the year when the enterprise breaks even and also is included in the project cost,.
a. cost of capital
b. Working capital
c. cost of production

d. cost of equity

58. What is the role of a Business Angel?
    a. To provide small business advice
    b. To provide capital for business development in exchange for a stake in the Business ownership
    c. To set up a franchise business
    d. All of the above
59. District Industries centers are located in each_____.
    a. district
    b. state
    c. Block
    d. All of the above
60. Seed capital assistance _____?
    a. Long term
    b. Initial
    c. Short term
    d. All of the above
61. The relation of ordinary shares to preference share capital and loan capital is described as the?
    a. capital
    b. capital structure
    c. cost of capital
    d. capital gearing
62. The possibility of some unfavorable occurrence in the business is called:
    a. Invention
    b. Innovation
    c. Risk
    d. Creativity
63. The entrepreneur's_____depends on his perception of the opportunity
    a. Commitment to opportunity
    b. Commitment of resources
    c. Strategic orientation
    d. None of these
64. The resistance of employees in an organization against flexibility, growth and diversification can be overcome by developing
    a. entrepreneurship
    b. intrapreneurship
    c. Administrator
    d. Manager
65. What is the minimum financial interest in share capital of women entrepreneur in the enterprise?
    a. 51 percent
    b. 60 percent

c. 49 percent
d. 33 percent

66 ---------- means raising funds in the business from the issue of shares.
a. Personal finance
b. Equity finance
c. Preference share
d. Public finance

67. When an entrepreneur raises the funds by acquiring the assets is called:
a. Personal finance
b. Leased finance
c. Preference share
d. Public finance

68. Which is an effective way to bring stakeholders together to discuss the project?
a. Business meeting
b. Kickoff meeting
c. Launching meeting
d. All of the above

69. Which technique is used to determine whether a project or activity is feasible by weighing the monetary cost of doing the project or activity versus the benefits?
a. Cost minimization analysis
b. Cost benefit analysis
c. Cost effective analysis
d. All of the above

70. Which of the following investment is the most risky investment?
a. Equity shares.
b. Preference shares.
c. Land
d. Debentures.

71. An investor who puts his own finance into the growth of a small business at an early stage is called:
a. Angel investor
b. Public investor.
c. venture capital investor.
d. None

72. Which of the following is the oldest form of business?
a. sole proprietorship.
b. Partnership
c. joint stock company.
d. co-operative undertaking.

73. Which of the following is not a part of entrepreneurial behaviors?
a. Solving problems
b. Taking initiatives
c. Taking responsibility

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d. Dictatorship

74. Which of the following sources is not use for medium term financing?
    a. Equity shares
    b. Debentures
    c. Debt
    d. All of above
75. Business risks can be_____.
    a. Avoided
    b. reduced
    c. ignored
    d. erased
76. Which is incorrect regarding venture capital?
    a. It provides financial support to the entrepreneurs
    b. It bears high risks
    c. It bears high reward from success.
    d. It bears low risk
77. Which type of finance is also known as *self finance*?
    a. Equity finance
    b. Debt finance
    c. Retained profits
    d. Personal finance
78. Which capital is required for acquisition of Land and Machines?
    a. Working capital
    b. Fixed capital
    c. Debenture capital
    d. None of these
79. Which capital is required for day-to-day operation?
    a. Fixed capital
    b. Working capital
    c. Debenture
    d. All of the above
80. Which is correct regarding working capital?
    a. It is relatively liquid capital
    b. It is required for holding current asset
    c. It meets the expenses on sales
    d. All of the above

Sub Code: RPH842

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**B PHARM**
**(SEM VIII) THEORY EXAMINATION 2019-20**
**PHARMACEUTICS-XII (FOOD & NEUTRACEUTICALS)**

***Time: 2 Hours*** ***Total Marks: 100***

*Note: Attempt all questions. The question paper contains 70 MCQ type questions. Each question carries equal marks. Select the answer and fill the appropriate bubble corresponding to that question in the attached OMR sheet.*

| Q no. | Question |
|---|---|

1. Alisha challenged her friends that one special vitamin would not be affected when she boils milk. Which vitamin is it?
   a) Vitamin C
   b) Vitamin D
   c) Vitamin B
   d) None of the mentioned
2. Hazards affecting food are _____
   a) Chemical, Biological, Physical
   b) Additives, Colour
   c) Pollutants
   d) All of the mentioned
3. Which of the following is an advantage of food processing?
   a) Availability of seasonal food throughout the year
   b) Removal of toxins and preserving food for longer
   c) Adds extra nutrients to some food items
   d) All of the mentioned
4. Which of the following is a performance parameter for the food industry?
   a) Hygiene
   b) Labour Used
   c) Hygiene & Labour Used
   d) None of the mentioned
5. XYZ Company takes its customer feedback very seriously. Hence when suggestions such as – food processed product should have minimum lost of actual flavour, no added colour etc., the company planned on shifting to the latest trend in the industry called _____
   a) Minimal Optimization
   b) None of the mentioned
   c) Minimal Processing
   d) All of the mentioned
6. Statement 1: Advanced Oxidation Processes convert non-biodegradable organic materials into biodegradable organic forms.
   Statement 2: Advanced Oxidation Processes are non-environmental friendly.
   a) True, False
   b) True, True
   c) False, False
7. Statement 1: Pulsed Electric field needs to followed by refrigeration storing to increase shelf life and prevent spoilage.

Statement 2: Structural changes at cell membrane and inactivation of enzymes, is how high hydrostatic pressure works for the food industry.

a) True, False
b) True, True
c) False, False
d) False, True

8. Statement 1: When several factors for food processing and preservation are applied to one food product, it is called Hurdle technology.
Statement 2: Hurdle technology has arisen due to demand of costumers for healthier and more nutritious food items.
a) True, False
b) True, True
c) False, False
d) False, True
9. Which of the following statements is true?
a) Multi-target preservation helps to target many factors such as pH, temperature etc and hence helps fight all types of microbes
b) It is desired to reduce the antagonist effects
c) Sometimes hurdle technology has antagonist effects
d) All of the mentioned
10. Statement 1: Hurdle technology is a 'multi-target preservation'.
Statement 2: The main target of food preservation is to help the harmful microorganisms to achieve homeostasis.
a) True, False
b) True, True
c) False, False
d) False, True
11. Which of the following methods refers to deactivation of microbes in food using electricity?
a) Power Ultrasound
b) Pulsed Electric field
c) Hurdle technology
d) All of the mentioned
12. Which of the following holds true for Pulsed Electric field?
a) It has been successful in pasteurizing milk, yogurt, soup etc
b) If there are no air bubbles present or the if food has low electrical conductivity, PEF is non-applicable
c) It's a continuous process. It cannot be applied for non-pump able solid food products
d) All of the mentioned
13. Which of the following is a food safety tool?
a) Good Hygiene Practice
b) Hazard Analysis Critical Control Point
c) Total Quality Management
d) All of the mentioned
14. Which among the following statements is untrue?
a) Self oxidation of lipids is called 'auto-oxidation'
b) High content of PUFA losing flavour is called rancidity

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c) Heating and frying lead to polymerization of fats
d) None of the mentioned

15. .In the history of packaging of the food industry, which among these was never a material of packaging?
a) Bakelite
b) Pottery and vases
c) Iron and tin plated steel
d) None of the mentioned

16. . Which of the given reasons, is NOT a valid reason for packaging of food items?
a) Security and portion control
b) Marketing and convenience
c) Protection and information transmission
d) None of the mentioned

17. Statement 1: Secondary packaging is outside the primary packaging, so as to group the primarily packed objects.
Statement 2: Packaging can be arbitrarily classified into Primary, Secondary and Tertiary Packaging.
a) True, False
b) True, True
c) False, False
d) False, True

18. Which of the following is a must in food labeling?
a) Name
b) Standard Specification
c) Place of Origin
d) All of the mentioned

19. Which of the following need not be in the same vision of field?
a) Product name
b) Quantity
c) Date mark
d) Place of Origin

20. It is legal for a label to say – 'this product cures xyz disease'.
a) True
b) False

21. Food Authenticity means
a) The food should match the description
b) The food should taste good
c) It should be cheap
d) None of the mentioned

22. Which of the following is a form of mis-description?
a) Incorrect Origin
b) Incorrect Quantitative Description
c) Extending the food
d) All of the mentioned

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23. In the high-temperature short-time (HTST) method of pasteurization, milk is exposed to a temperature of _____
    a) 132 degree F
    b) 145 degree F
    c) 161 degree F
24. Sterilization occurs at high temperatures for long periods of time.
    a) True
    b) False
25. Which of the following microorganism survive at -9 to -17 degree C?
    a) Salmonella
    b) Staphylococci
    c) Bacilli
    d) Clostridium
26. Phosphatase enzyme present in milk is destroyed in which of the following processes?
    a) Sterilization
    b) Canning
    c) Dehydration
    d) Pasteurization
27. Jellies and jams are rarely affected by bacterial action.
    a) True
    b) False
28. Which chemical is used to inhibit mold growth in bread?
    a) benzoic acid
    b) nitrates
    c) sorbic acid
    d) lactic acid
29. Which of the following are benefits and advantages of Fortification of Food?
    1) Doesn't change existing food patterns
    2) Alters the characteristics of the food
    3) Safe and cost effective
    a) 1, 3. b)1,2. C)2,3. D) All of these
30. What is Fortification of food?
    a. Deliberately increasing the content of an essential micronutrient in food
    b. Providing tablets containing vitamins and minerals along with food
    c. Proper cooking and storage of food to avoid loss of nutrients
    d. Ensuring minimum amount of nutrients in food
31. Which one of the following foods does not contain carbohydrate:
    a. potato
    b.sugar
    C.meat
    D rice
32. Why is dietary fibre considered to be an active nonnutrient?
    a) It has antiinflammatory properties but is not stored as fat.
    b) It is broken down in the body to provide energy
    c) It acts to stop low density lipoproteins breaking apart.
    d) Not absorbed but is beneficial to the digestive system.

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33. Which of the following is an active nonnutrient?
    a) Fat
    b) Fibre
    c) Protei
    d) Sugar
34. A diet high in cholesterol is most likely to lead to disease in which organ of the body?
    a) Heart
    b) Kidney
    c) Liver
    d) Pancreas
35. Which of the following is a functional food?
    a) Soy and linseed biscuits
    b) Seedless watermelon
    c) Air popped popcorn
    d) Low fat milk
36. Which of the following is an example of a nutritionally modified food?
    a) Low fat milk
    b) Organic yoghurt
    c) Parmesan cheese
    D) Chocolate flavoured milk
37 Which of the following is the primary benefit of consuming food products rich in probiotics?
    a) Reduced fatigue
    b) Improved memory
    c) Increased gut flora
    d) Improved cardiovascular health.
38. Consuming foods with a low glycaemic index is useful in the management of which condition
    a) Diabetes
    b) Osteoporosis
    c) Hypertension
    d) Coronary Heart Disease
39. Which of the following enhances gut functioning?
    a) Probiotics
    b) Antioxidants
    c) Oestrogen
    d) Omega 3 fatty acids
40. What type of food is fibre enriched bread?
    a) Modified processed
    b) Phytochemical
    c) Antioxidant
    d) Probiotic
41. Bread, which has been fortified with vitamins and minerals, is classified as which type of food?
    a) Organic
    b) Genetically modified
    c) Functional
    d) Specialised
42. In the manufacture of bread, what must be added to wheat flour under Australian mandatory fortification standards?
    a) Folic acid and iron
    b) Iodine and thiamin
    c) Vitamin D and calcium
    d) Thiamine and folic acid

43. What are the goals of Regulatory Affairs Professionals?
a) Protection of human health
b) Ensuring safety, efficacy and quality of drugs
c)Ensuring appropriateness and accuracy of product information
d) All of the above

44. What are the Roles of Regulatory Affairs professionals?
a)Preparation of organized and scientifically valid NDA, ANDA,INDA ,
b)Ensure adherence and compliance withapplicable cGMP, ICH, GCP, GLP guidelines
c)Providing expertise and regulatory intelligence in translating regulatory requirements
d) All of the above

45. What are the types of active substances for which ASMFs are submitted?
a) New active substances
b) not included inEuropean Pharmacopoeiaor the pharmacopoeia of an EU Member
c)Pharmacopeial active substances included in the pharmacopoeia of an EU Member
d)All of the above

46. What is Orange Book

a) "Approved Drug Products with Therapeutic Equivalence Evaluations",
b) It contains the list of drug products, approved on the basis of safety and effectiveness by the Food and Drug Administration (FDA) under the Federal Food, Drug, and Cosmetic Act
c) Both a and b
d) None of the above

47. What does FSS stand for?
a) Food set and sound
b) Food Secure and Safe
c) Food Safety and Security
d) Food sour and sign

48. It is a clause that the writing on the label of the container has to be clear.
a) True
b) False

49.. Which of the following food item has been exempted from labeling?
a) On the spot food like bakery items
b) Ready to eat food
c) Food served on plane/ vending machine
d) All of the mentioned

50. Statement 1: nutrition information has to be given as same order as instructed.
Statement 2: '% Daily Value' is present at the right corner to inform consumers
a) True, False
b) True, True
c) False, False
d) False, True

51. Nutrition claim means _____
a) A food has certain nutritional properties including but not limited to the energy value
b) A food has certain limitations

c) All of the mentioned
d) None of the mentioned

52. Which among the following claims is prohibited?
a) Substantiated Claims
b) Claims of Veg/non- veg
c) All of the mentioned
d) None of the mentioned

53. Which among these is a factor for processed food in India?
a) Changing lifestyles
b) Food habits
c) Organized food retail
d) All of the mentioned

54. Which of the following are NOT key constraints of the food processing industry?
a) Inadequate quality control
b) High packaging cost
c) Low demand
d) Poor infrastructure as in no cold storage, warehouse etc

55. Which of the following comes under grain processing in India?
a) Oil seed processing
b) Wheat processing
c) Oil seed & Wheat processing
d) None of the mentioned

56. Which of the following is true about fruits and vegetable processing?
a) They get spoil very fast and hence need to be consumed soon
b) They have high moisture content and should be kept in a cold, dark place
c) They're tender and hence get spoiled easily
d) All of the mentioned

57. Which body issues FPO mark?
a) Food Safety and Standard Authority of India
b) Bureau of Indian Standard
c) Ministry of Environment and protection
d) None of these

58. Since when FPO mark is mandatory for the concerned products?
a) 2006
b) 1993
c) 2000
d) 1986

59. Who issues Eco mark certificate?
(a) Ministry of Environment
(b) Bureau of Indian Standard
(c) Ministry of consumer affairs
(d) Ministry of commerce

60. Which of the following is matched correctly?
(a) AGMARK: Jewellery
(b) ISI mark: Agri products
(c) Ecomark: Issued for organic products
(d) FPO mark**:** All processed food products

61. Which certificate is required to jewelers in the market?
(a) FPO mark ,(b) AGMARK ,(c) BIS hallmark ,(d) None of these

62. Which of the following is untrue?
a) Vitamins are inorganic elements whereas minerals are organic elements
b) Fats soluble vitamins have more tendency to lead to hypervitaminosis
c) Fat soluble vitamins are absorbed by lipids in the intestinal tract
d) B and C are water soluble vitamin

63. one special vitamin would not be affected when she boils milk. Which vitamin is it?
a) Vitamin C
b) Vitamin D
c) Vitamin B
d) None of the mentione

64. Which among the following statements is untrue?
a) Self oxidation of lipids is called 'auto-oxidation'
b) High content of PUFA losing flavour is called rancidity
c) Heating and frying lead to polymerization of fats
d) None of the mentioned

65. Statement 1: Pathogenic bacteria look, smell and taste perfectly normal.
Statement 2: To multiply, bacteria require warmth, food, moisture and time.
Which of the following holds true for statement 1 and statement 2 respectively?
a) True, False
b) True, True
c) False, False
d) False, True .

66.Statement 1: Foreign objects entering food is called physical contamination of food.
Statement 2: Controlling moisture is the only precaution to be taken to prevent food
a) True, False
b) True, True
c) False, False
d) False, True

67.A substance intentionally added that affects the nature and quality of food is called
a) Food poison
b) Food adulterant
c) Food contaminant
d) Food material

68.When do we say that food is adulterated under the PFA Act?
a) If it is obtained from a diseased animal

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b) If spices are sold without their essence
c) If any ingredient is injurious to health
d) All of the mentioned

69. Statement 1: In the process of making certain oils, nickel is added as catalyst.
Statement 2: Nickel is injurious for consumption.
a) True, False
b) True, True
c) False, False
d) False, True

70. Which of the following is an adulterant?
a) Urea
b) Pesticides
c) Iron filings in tea
d) All of the mentioned

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**EI8075- Fibre Optics and Laser Instrumentation**

## OBJECTIVE TYPE QUESTIONS

**Regulation: 2017, Odd Semester**

1) In an optical fiber communication system, which among the following is not a typical transmitter function?

a. Coding for error protection
b. Decoding of input data
c. Electrical to optical conversion
d. Recoding to match output standard

ANSWER: (d) Recoding to match output standard

2) Which among the following is provided by an optical receiver for the regeneration of data signal with minimum error?

a. Photo-diode
b. Signal Processing Circuits
c. Linear Circuitry
d. None of the above

ANSWER: (c) Linear Circuitry

3) For a sine wave, the frequency is represented by the cycles per _____

a. Second
b. Minute
c. Hour
d. None of the above

ANSWER: (a) Second

4) Which property/ies of PCM stream determine/s the fidelity to original analog signal?

a. Sampling rate

b. Bit depth
c. Both a and b
d. None of the above

ANSWER: (c) Both a and b

5) In single-mode fibers, how does the fraction of energy traveling through bound mode appear in the cladding?

a. As a crescent wave
b. As a gibbous wave
c. As an evanescent wave
d. All of the above

ANSWER: (c) As an evanescent wave

6) What is the typical value of refractive index for an ethyl alcohol?

a. 1
b. 1.36
c. 2.6
d. 3.4

ANSWER:(b) 1.36

7) If a light travels in a certain medium and it gets reflected off an optically denser medium with high refractive index, then it is regarded as _____

a. External Reflection
b. Internal Reflection
c. Both a and b
d. None of the above

ANSWER: (a) External Reflection

8) In an optical fiber, the concept of Numerical aperture is applicable in describing the ability of _____

a. Light Collection
b. Light Scattering
c. Light Dispersion
d. Light Polarization

ANSWER:(a) Light Collection

9) Which among the following do/does not support/s the soot formation process?

a. OVPO
b. MCVD
c. PCVD
d. All of the above

ANSWER: (c) PCVD

10) Which type of photonic crystal fiber exhibit/s its/their similarity to the periodic crystalline lattice in a semiconductor?

a. Index guiding fiber
b. Photonic bandgap fiber
c. Both a and b
d. None of the above

ANSWER: (b) Photonic bandgap fiber

11) Which type of fiber optic cable has/have its/their core with the size of about 480 µm to 980 µm & made up of polymethylmethacrylate (PMMA)?

a. Glass fiber optic cable
b. Plastic fiber optic cable
c. Plastic clad silica fiber optic cable
d. All of the above

ANSWER: (b) Plastic fiber optic cable

12) In multifiber cable system, which form of outer jacket/s consist/s of polyolefin compounds and are regarded as halogen free?

a. OFNR
b. OFNP
c. LSZH
d. All of the above

ANSWER: (c) LSZH

13) During the design of FOC system, which among the following reasons is/are responsible for an extrinsic absorption?

a. Atomic defects in the composition of glass
b. Impurity atoms in glass material
c. Basic constituent atoms of fiber material

d. All of the above

ANSWER: (b) Impurity atoms in glass material

14) Which among the following represent/s the measure/s to minimize the inhomogenities for Mie scattering reduction?

a. Extrusion Control
b. Increase in relative R.I. difference
c. Removal of imperfections due to glass manufacturing process
d. All of the above

ANSWER: (d) All of the above

15) In Kerr effect, induced index change has its proportionality with respect to _____

a. square of electric field
b. cube of electric field
c. cube root of electric field
d. one-fourth power of electric field

ANSWER: (a) square of electric field

16) Which among the following is regarded as an inelastic scattering of a photon?

a. Kerr Effect
b. Raman Effect
c. Hall Effect
d. Miller Effect

ANSWER: (b) Raman Effect

17) Which kind/s of misalignment assist/s in the reduction of overlap region in fiber?

a. Angular
b. Longitudinal
c. Lateral
d. All of the above

ANSWER: (c) Lateral

18) Which is the correct order of sequential steps for an electric arc fusion technique?

A. Pressing of fiber ends for fusion
B. Application of heat for smoothening of end-surfaces

C. Alignment of broken fiber edges

a. A, B, C
b. B, A, C
c. C, B, A
d. C, A, B

ANSWER: (c) C, B, A

19) Which splicing technique involves the alignment and locking of broken fiber edges by means of positioning devices & optical cement?

a. Fusion
b. Mechanical
c. Both a and b
d. None of the above

ANSWER:(b) Mechanical

20) By using Springroove splicing technique, what is the value of mean insertion loss for multi mode graded index fiber?

a. 0.01
b. 0.03
c. 0.05
d. 0.09

ANSWER: (c) 0.05

21) In the fiber optic link, power transfer from one fiber to another and from fiber to detector must take place with _____coupling efficiency.

a. maximum
b. stable
c. minimum
d. unpredictable

ANSWER: (a) maximum

22) In spontaneous emission, the light source in an excited state undergoes the transition to a state with _____

a. Higher energy
b. Moderate energy
c. Lower energy

d. All of the above

ANSWER: (c) Lower energy

23) Which among the following is a key process adopted for the laser beam formation as it undergoes the light amplification?

a. Spontaneous Emission
b. Stimulated Emission
c. Both a and b
d. None of the above

ANSWER: (b) Stimulated Emission

24) While coupling of LEDs with fiber, on which factor/s does the size of source and lighting angle generated within the semiconductor depend/s?

a. Geometry of die
b. Refractive index of semiconductor
c. Encapsulation Medium
d. All of the above

ANSWER: (d) All of the above

25) Which among the following results in the removal of LED lens interface for achieving high coupling efficiency?

a. Spherical lens
b. Cylindrical lens
c. Integral lens LED
d. All of the above

ANSWER: (c) Integral lens LED

26) For a photo-diode with responsivity of 0.50 A/W & optical power of about 12µW, what would be the value of generated photocurrent?

a. 3 µA
b. 6 µA
c. 9 µA
d. 12 µA

ANSWER: (b) 6 µA

27) Which component of an optical receiver is a linear frequency shaping filter used for the compensation of signal distortion and Inter Symbol Interference (ISI)?

a. Photodetector
b. Amplifier
c. Equalizer
d. None of the above

ANSWER: (c) Equalizer

28) In digital receivers, which codes are used to designate the sampled analog signals after their quantization into discrete levels?

a. Binary
b. Decimal
c. ASCII
d. Excess-3

ANSWER: (a) Binary

29) Which feature of an eye-diagram assists in the measurement of additive noise in the signal?

a. Eye opening (height, peak to peak)
b. Eye overshoot/ undershoot
c. Eye width
d. None of the above

ANSWER: (a) Eye opening (height, peak to peak)

30) Which method determines the dispersion limitation of an optical link?

a. Link power budget
b. Rise time budget
c. Both a and b
d. None of the above

ANSWER: (b) Rise time budget

31) Which phenomenon causes the dynamic line width broadening under the direct modulation of injection current?

a. Modal Noise
b. Mode-partition Noise
c. Frequency Chirping

d. Reflection Noise

ANSWER: (c) Frequency Chirping

32) Speckle pattern is generated due to interference of nodes from a coherent source especially when the coherence time of source is _____ the intermodal dispersion time in the fiber.

a. Less than
b. Greater than
c. Equal to
d. None of the above

ANSWER: (b) Greater than

33) Which among the following is/are determined by the fiber characterization?

a. Fiber integrity & performance for desired transmission rate
b. Installation practices
c. Service Implementation
d. All of the above

ANSWER: (d) All of the above

34) From the tests carried out in fiber characterization, which among the following measures the total light reflected back to the transmitter caused by the fiber as well as the components like connector pairs and mechanical splices?

a. ORL
b. OTDR
c. LTS
d. PMD

ANSWER: (a) ORL

35) In fiber fault location, the equation of length (l) for time difference (t) is expressed as L = ct / 2n1 . Which factor in this equation implies that the light travels a length from source to break point and then through another length on the return trip?

a. L
b. c
c. t
d. 2

ANSWER: (d) 2

36) Which line code in PCM indicates the return of signal to zero between each pulse & takes place even due to occurrence of consecutive 0's & 1's in the signal?

a. Return-to-zero (RZ)
b. Non-Return to zero space
c. Return to zero inverted
d. Non-return to zero inverted

ANSWER: (a) Return-to-zero (RZ)

37) In the structure of fiber, the light is guided through the core due to total internal _____

a. reflection
b. refraction
c. diffraction
d. dispersion

ANSWER: (a) reflection

38) In the structure of a fiber, which component provides additional strength and prevents the fiber from any damage?

a. Core
b. Cladding
c. Buffer Coating
d. None of the above

ANSWER: (c) Buffer Coating

39) Which is the transmission medium for VLF electromagnetic waves especially applicable for aeronautical and submarine cables?

a. Paired wires
b. Coaxial cable
c. Waveguide
d. Wireless

ANSWER: (a) Paired wires

40) Which rays exhibit the variation in the light acceptability ability of the fiber?

a. Meridional
b. Skew
c. Leaky
d. All of the above

ANSWER: (b) Skew

41) If a fiber operates at 1400nm with the diameter of about 10 µm, n1 = 1.30, Δ = 0.80% , V = 3.5, then how many modes will it have?

a. 6.125
b. 9.655
c. 12.95
d. 16.55

ANSWER: (a) 6.125

42) Which kind of dispersion phenomenon gives rise to pulse spreading in single mode fibers?

a. Intramodal
b. Intermodal
c. Material
d. Group Velocity

ANSWER: (a) Intramodal

43) With respect to single mode and graded index fibers, which parameter specifies the propagation of polarization modes with different phase velocities & the difference between their effective refractive indices?

a. Mode field diameter
b. Birefringence
c. Fiber beat length
d. Spot Size

ANSWER: (b) Birefringence

44) On which of the following factor/s do/does the 'Hydrogen Effect' depend/s?

a. Type of fiber & Cable Design
b. Operating Wavelength
c. Installation Method
d. All of the above

ANSWER: (d) All of the above

45) Consider the statements given below. Which among them is not a drawback of double crucible method?

a. Utility in mass production of fibers
b. High attenuation
c. High OH content in drawn fiber
d. Addition of impurity while the fiber is drawn

ANSWER: (a) Utility in mass production of fibers

46) Consider the assertions given below. Which is the correct sequential order of process adopted in glass fiber preparation?

A. Drawing of fiber
B. Production of pure glass
C. Pulling of fiber
D. Conversion of pure glass into preform

a. B, D, A, C
b. A, B, C, D
c. C, A, D, B
d. D, B, A, C

ANSWER: (a) B, D, A, C

47) At which level of temperature does the oxidation process occur in MCVD?

a. Low
b. Moderate
c. High
d. Unpredictable

ANSWER: (c) High

48) Assuming no ISI, the maximum possible bandwidth of a multimode graded index fiber with 5 MHz, shows the total pulse broadening of 0.1s for the distance of about 12km. What would be the value of bandwidth length product?

a. 40 MHz
b. 60 MHz
c. 90 MHz
d. 120 MHz

ANSWER: (b) 60 MHz

49) In Rayleigh scattering of light in glass, at which type of temperature does the glass attain the state of thermal equilibrium and exhibits its relativity to annealing temperature?

a. Junction
b. Fictive
c. Breakdown
d. Decomposition

ANSWER: (b) Fictive

50) Which type of scattering occurs due to interaction of light in a medium with time dependent optical density variations thereby resulting into the change of energy (frequency) & path?

a. Stimulated Brilliouin Scattering (SBS)
b. Stimulated Raman Scattering (SRS)
c. Mie Scattering
d. Rayleigh Scattering

ANSWER: (a) Stimulated Brilliouin Scattering (SBS)

Founded the wave theory of light
a. Francesco Grimaldi
b. Edward Appleton
c. James Clerk Maxwell
d. Christian Huygens

Answer: Option D

2. Proposed the use of clad glass fiber as a dielectric waveguide
a. Karpon and Keck
b. Karpon and Bockham
c. Bockham and Kao
d. Kao and Keck

Answer: Option C

3. Developed the first laser
a. Charles Townes
b. Theodore Maiman
c. Gordon McKenzie
d. Albert Einstein

Answer: Option B

4. The band of light wavelengths that are too long to be seen by the human eye

a. Amber
b. Visible
c. Infrared
d. Ultraviolet

Answer: Option C

5. The band of light wavelengths that are too short to be seen by the human eye
a. Amber
b. Visible
c. Infrared
d. Ultraviolet

Answer: Option C

6. Which color has the shortest wavelength of light?
a. Red
b. Yellow
c. Blue
d. Green

Answer: Option C

7. What generates a light beam of a specific visible frequency?
a. Laser
b. Maser
c. Infrared
d. Flashlight

Answer: Option A

8. Which of the following materials is sensitive to light?
a. Photoresist
b. Photosensitive
c. Light Sensitive
d. Maser

Answer: Option A

9. The core of an optical fiber has a
a. Lower refracted index than air
b. Lower refractive index than the cladding
c. Higher refractive index than the cladding
d. Similar refractive index with the cladding

Answer: Option C

10. Is the different angle of entry of light into an optical fiber when the diameter of the core is many times the wavelength of the light transmitted.
a. Acceptance angle
b. Modes
c. Sensors
d. Aperture

Answer: Option B

11. The loss in signal power as light travels down a fiber is called
a. Dispersion
b. Scattering
c. Absorption
d. Attenuation

Answer: Option D

12. The bandwidth of optical fiber
a. 900M Hz
b. 900 PHz
c. 900 THz
d. 900 EHz

Answer: Option C

13. If a mirror is used to reflect light, the reflected light angle is ____ as the incident angle
a. Smaller
b. Larger
c. The same
d. Independent

Answer: Option C

14. What is a specific path the light takes in an optical fiber corresponding to a certain angle and number of reflection
a. Mode
b. Grade
c. Numerical Aperture
d. Dispersion

Answer: Option A

15. Is the width of the range of wavelengths emitted by the light source

a. Bandwidth
b. Chromatic Dispersion
c. Spectral width
d. Beamwidth

Answer: Option C

16. Which theory states that the light wave behaves as if it consists of many tiny particles?
a. Huygen's theory
b. Wave theory of light
c. Nyquist theory
d. Quantum theory

Answer: Option D

17. Fiber optic cables operate at frequencies near
a. 20 MHz
b. 200 MHz
c. 2G Hz
d. 800 THz

Answer: Option D

18. When a beam of light enters one medium from another, which quantity will not change?
a. Direction
b. Speed
c. Frequency
d. Wavelength

Answer: Option C

19. Dispersion is used to describe the
a. Splitting of white light into its component colors
b. Propagation of light in straight lines
c. Bending of a beam of light when it goes from one medium to another
d. Bending of a beam light when it strikes a mirror

Answer: Option A

20. Luminance efficiency is minimum for a
a. Fluorescent tube
b. High wattage light bulb
c. Mercury vapor lamp
d. Low wattage light bulb

Answer: Option D

21. An object farther from a converging lens than its focal point always has a/an _____ image.
a. Inverted
b. The same in size
c. Virtual
d. Smaller size

Answer: Option A

22. An object nearer to a converging lens than its focal point always has a/an _____ image.
a. Inverted
b. The same in size
c. Virtual
d. Smaller size

Answer: Option C

23. The real image formed by a spherical mirror is ____ relative to its object
a. Erect
b. Inverted
c. Smaller
d. Larger

Answer: Option D

24. The wavelength of light has no role in
a. Diffraction
b. Interference
c. Polarization
d. Reflection

Answer: Option C

25. Longitudinal waves do not exhibit
a. Polarization
b. Refraction
c. Reflection
d. Diffraction

Answer: Option A

26. _____ dispersion is caused by the difference in the propagation times of light rays that take different paths down a fiber.
a. Material dispersion

b. Wavelength dispersion
c. Modal dispersion
d. Delay dispersion

Answer: Option C

27. What is the average insertion loss of fusion splice in fiber optics?
a. 0.09 dB
b. 0.9 dB
c. 0.19 dB
d. 0.009 dB

Answer: Option A

28. What is the insertion loss of connector-type splices for a single mode fiber optics?
a. 0.51 dB
b. 0.31 dB
c. 0.49 dB
d. 0.38 dB

Answer: Option D

29. What is the lifetime of LEDs?
a. 200,000 minutes
b. 200,000 hours
c. 150,000 minutes
d. 150,000 hours

Answer: Option B

30. What is the lifetime of ILDs?
a. 50,000 hours
b. 75,000 hours
c. 100,000 hours
d. 125,000 hours

Answer: Option A

31. Photodiodes used as fiber optic directors are
a. Unbiased to generate a voltage same as a solar cell
b. Forward bias
c. Reversed bias
d. Thermoelectrically cooled

Answer: Option C

32. What type of fiber has the highest modal dispersion?
a. Step-index multimode
b. Graded index multimode
c. Step-index single mode
d. Graded index mode

Answer: Option A

33. Laser light is _____ emission.
a. Coherent
b. Stimulated
c. Spontaneous
d. Coherent and stimulated

Answer: Option D

34. A dielectric waveguide for the propagation of electromagnetic energy at light frequencies
a. Stripline
b. Microstrip
c. Laser beam
d. Fiber optics

Answer: Option D

35. Is a non-coherent light source foe optical communications system.
a. ILD
b. LED
c. APD
d. PIN Diode

Answer: Option B

36. Which type of laser is the simplest to modulate directly by changing its excitation?
a. Semiconductor
b. Ruby
c. Helium-neon
d. Neodymium-YAG

Answer: Option A

37. Which laser emits light in the visible range 400 to 700 nm?
a. Argon-ion
b. Nitrogen
c. Carbon-dioxide

d. Neodymium-YAG

Answer: Option A

38. Which is the proper measurement of average power emitted by a pulsed laser?
a. Energy x time
b. Pulse energy x repetition rate
c. Pulse energy / repetition rate
d. Peak power x pulse length

Answer: Option B

39. What is the photon energy for an infrared wave with frequency of 10^12 Hz?
a. 10.6 x 10^34 joules
b. 6.63 x 10^-34 joules
c. 6.63 x 10^-22 joules
d. 10.6 x 10^22 joules

Answer: Option C

40. A positive lens with a focal length of 10 cm forms a real image of an object 20 cm away from the lens. How far is the real image from the lens?
a. 5 cm
b. 10 cm
c. 15 cm
d. 20 cm

Answer: Option D

41. Which of the following factor does not harm laser efficiency?
a. Atmospheric absorption
b. Excitation energy not absorbed
c. Problems in depopulating the lower laser level
d. Inefficiency in populating the upper laser level

Answer: Option A

42. Which of the following contributes to the broadening of laser emission bandwidth?
a. Doppler shift of moving atoms and molecules
b. Amplification within the laser medium
c. Coherence of the laser light
d. Optical pumping of the laser transition

Answer: Option A

43. The first laser emitted
a. Pulses of 694 nm red light
b. A continuous red beam
c. Pulses of white light from a helical flash lamp
d. Spontaneous emission

Answer: Option A

44. What is the stage of the sand becoming a silicon?
a. Liquid
b. Gas
c. Molten
d. Hot

Answer: Option C

45. Which of the following is used as an optical transmitter on the Fiber Optical Communications?
a. APD
b. LSA diode
c. PIN diode
d. LED

Answer: Option D

46. Which of the following is used as an optical receiver in fiber optics communications
a. APD
b. Tunnel diode
c. Laser diode
d. LED

Answer: Option A

47. The numerical aperture of a fiber if the angle of acceptance is 15 degrees, is
a. 017
b. 0.26
c. 0.50
d. 0.75

Answer: Option B

48. The inner portion of the fiber cable is called
a. Cladding
b. Coating
c. Inner conductor
d. Core

Answer: Option D

49. Which type of laser is the simplest to modulate directly by changing its excitation?
a. Semiconductor
b. Ruby
c. Helium-neon
d. Neodymium-YAG

Answer: Option A

50. The laser frequency when the light has the wavelength 800 nm is
a. 375 x 10^12 Hz
b. 475 x 10^15 Hz
c. 375 x 10^9 Hz
d. 375 x 10^18 Hz

Answer: Option A

51. Which of the following is not a common application of fiber-optic cable?

a. Computer networks

b. Long-distance telephone systems

c. Closed circuit TV

d. Consumer TV

View Answer:
Answer: Option D

Solution:

52. Total internal reflection takes place if the light ray strikes the interface at an angle with what relationship to the critical angle?

a. Less than

b. Greater than

c. Equal to

d. Zero

View Answer:
Answer: Option B

Solution:

53. The operation of the fiber-optic cable is based on the principle of

a. Refraction

b. Reflection

c. Dispersion

d. Absorption

View Answer:
Answer: Option B

Solution:

54. Which of the following is not a common type of fiber-optic cable?

a. Single-mode step-index

b. Multimode graded-index

c. Single-mode graded-index

d. Multimode step-index

View Answer:
Answer: Option C

Solution:

55. Cable attenuation is usually expressed in terms of

a. Loss per foot

b. dB/km

c. intensity per mile

d. voltage drop per inch

View Answer:
Answer: Option B

Solution:

56. Which of the cable length has the highest attenuation?

a. 1 km

b. 2 km

c. 95 ft

d. 5500 ft

View Answer:
Answer: Option B

Solution:

57. The upper pulse rate and information carrying capacity of a cable is limited by

a. Pulse shortening

b. Attenuation

c. Light leakage

d. Modal dispersion

View Answer:
Answer: Option D

Solution:

58. The core of a fiber optic cable is made of

a. Air

b. Glass

c. Diamond

d. Quartz

View Answer:
Answer: Option B

Solution:

59. The core of a fiber optic is surrounded by

a. Wire braid shield

b. Kevlar

c. Cladding

d. Plastic insulation

View Answer:
Answer: Option C

Solution:

60. The speed of light in plastic compared to the speed of light in air is

a. Slower

b. Faster

c. The same

d. Either lower or faster

View Answer:
Answer: Option A

Solution:

61. Which of the following is not a major benefit of fiber-optic cable?

a. Immunity from interference

b. No electrical safety problems

c. Excellent data security

d. Lower cost

View Answer:
Answer: Option B

Solution:

62. The main benefit of light-wave communications over microwaves or any other communications media is

a. Lower cost

b. Better security

c. Wider bandwidth

d. Freedom from interference

View Answer:
Answer: Option C

Solution:

63. Which of the following is not part of the optical spectrum?

a. Infrared

b. Ultraviolet

c. Visible color

d. X-rays

View Answer:
Answer: Option D

Solution:

64. The wavelength of visible light extends from

a. 0.8 to 1.0 nm

b. 400 to 750 nm

c. 200 to 660 nm

d. 700 to 1200 nm

View Answer:
Answer: Option B

Solution:

65. The speed of light is

a. 186,000 mi/h

b. 300 mi/h

c. 300,000 m/s

d. 300,000,000 m/s

View Answer:
Answer: Option D

Solution:

66. Refraction is the

a. Bending of light waves

b. Reflection of light waves

c. Distortion of light waves

d. Diffusion of light waves

View Answer:
Answer: Option A

Solution:

67. The ratio of speed of light in air to the speed of light in another substance is called the

a. Speed factor

b. Index of reflection

c. Index of refraction

d. Dielectric constant

View Answer:
Answer: Option C

Solution:

68. A popular light wavelength in fiber-optic cable is

a. 0.7 μm

b. 1.3 μm

c. 1.5 μm

d. 1.8 μm

View Answer:
Answer: Option B

Solution:

69. Which type of fiber optic cable is most widely used?

a. Single-mode step-index

b. Multimode step-index

c. Single-mode graded-index

d. Multimode graded-index

View Answer:
Answer: Option A

Solution:

70. Which type of fiber-optic cable is the best for very high speed data?

a. Single-mode step-index

b. Multimode step-index

c. Single-mode graded-index

d. Multimode graded-index

View Answer:
Answer: Option A

Solution:

71. Which type of fiber-optic cable has the least modal dispersion?

a. Single mode step-index

b. Multimode step-index

c. Single-mode graded-index

d. Multimode graded-index

View Answer:
Answer: Option A

Solution:

72. Which of the following is not a factor in cable light loss?

a. Reflection

b. Absorption

c. Scattering

d. Dispersion

View Answer:
Answer: Option A

Solution:

73. A distance of 8 km is the same as

a. 2.5 mi

b. 5 mi

c. 8 mi

d. 12.9 mi

View Answer:
Answer: Option B

Solution:

74. A fiber-optic cable has a loss of 15 dB/km. The attenuation in a cable, 100 ft long is

a. 4.57 dB

b. 9.3 dB

c. 24 dB

d. 49.2 dB

View Answer:
Answer: Option A

Solution:

75. Fiber-optic cables with attenuations of 1.8, 3.4, 5.9, and 18 dB are linked together. The total loss is

a. 7.5 dB

b. 19.8 dB

c. 29.1 dB

d. 650 dB

View Answer:
Answer: Option C

Solution:

76. Which light emitter is preferred for high speed data in a fiber-optic system

a. Incandescent

b. LED

c. Neon

d. Laser

View Answer:
Answer: Option D

Solution:

77. Most fiber-optic light sources emit light in which spectrum?

a. Visible

b. Infrared

c. Ultraviolet

d. X-ray

View Answer:
Answer: Option B

Solution:

78. Both LEDs and ILDs operate correctly with

a. Forward bias

b. Reverse bias

c. Neither A or B

d. Either A or B

View Answer:
Answer: Option A

Solution:

79. Single-frequency light is called

a. Pure

b. Intense

c. Coherent

d. Monochromatic

View Answer:
Answer: Option D

Solution:

80. Laser light is very bright because it is

a. Pure

b. White

c. Coherent

d. Monochromatic

View Answer:
Answer: Option C

Solution:

81. Which of the following is NOT a common light detector

a. PIN photodiode

b. Photovoltaic diode

c. Photodiode

d. Avalanche photodiode

View Answer:
Answer: Option B

Solution:

82. Which of the following is the fastest light sensor

a. PIN photodiode

b. Photovoltaic diode

c. Phototransistor

d. Avalanche photodiode

View Answer:
Answer: Option D

Solution:

83. Photodiodes operate property with

a. Forward bias

b. Reverse bias

c. Neither A or B

d. Either A or B

View Answer:
Answer: Option B

Solution:

84. The product of the bit rate and distance of a fiber-optic system is 2 Gbits km/s. What is the maximum rate at 5 km?

a. 100 Mbits/s

b. 200 Mbits/s

c. 400 Mbits/s

d. 1000 Gbits/s

View Answer:
Answer: Option C

Solution:

85. Which fiber-optic system is better?

a. 3 repeaters

b. 8 repeaters

c. 11 repeaters

d. 20 repeaters

View Answer:
Answer: Option A

Solution:

**1. The macroscopic bending losses show an exponential increase due to _____ in radius of curvature.**

A. Increase
**B. Decrease**
C. Stability
D. None of the above

**2. Which type of mechanical splicing exhibits the permanent bonding of prepared fiber ends with the rigid alignment of the tube?**

**A. Snug Tube Splicing**
B. Loose Tube Splicing
C. Elastomeric Splicing
D. Precision Pin Splicing

**3. Which component of fiber-optic connector has a provision of entry for the fiber along with the fixation to connector housing?**

A. Ferrule
**B. Cable**
C. Connector Housing
D. Coupling Device

**4. Which among the following is regarded as a keyed bayonet connector along with its feasibility of easiest insertion and removal from the fiber optic cable?**

A. FC Connectors
B. LC Connectors
C. MT-RJ Connectors
**D. ST Connectors**

**5. How many mating cycles are being rated by typically matched SC Connectors?**

A. 500
B. 600
C. 800
**D. 1000**

**6. In Stimulated Emission, which among the following parameters of generated photon is/are similar to the photon of incident wave?**

A. Phase
B. Frequency
C. Polarization & direction of travel
**D. All of the above**

**7. Consider a crystal of ruby laser whose length is 6 cm and the refractive index is 1.8, emits the wavelength of about 0.55 μm. What will be the value of number of longitudinal modes?**

**A. 3.9 x 105**
B. 4.9 x 105
C. 5.6 x 105
D. 7.7 x 105

**8. In a laser structure, the existence of standing waves is possible at frequencies for which the distance between the mirrors is an integral number of _____**

**A. λ / 2**
B. λ / 4
C. λ / 6
D. λ / 8

**9. The small section of fiber which is coupled to the optical source is known as _____**

A. Flylead
B. Pigtail
**C. Both a and b**
D. None of the above

**10. In Lambertian output pattern of LED, the source is _____ bright from all directions.**

A. Less
**B. Equally**
C. More
D. Unpredictably

**11. In pyroelectric photo detectors, the consequent increase in dielectric constant due to temperature variation by the photon absorption, is generally measured as change in _____**

A. resistance
B. inductance
C. admittance
**D. capacitance**

**12. Which type of preamplifier plays a crucial role in reducing the effect of thermal noise?**

A. Low Impedance Pre-amplifier
**B. High Impedance Preamplifier**
C. Transimpedance Preamplifier
D. None of the above

**13. In high impedance preamplifier, how are the noise sources kept to minimum level?**

A. By reducing dark current with proper selection of photodiode
B. By reducing thermal noise of biasing resistor
C. By using high impedance amplifier
**D. All of the above**

**14. Which among the following are the disadvantages of an optical feedback transimpedance receiver?**

A. Increase in receiver input capacitance
B. Increase in dark current
C. Decrease in receiver input capacitance
D. Decrease in dark current

**A. A & B**
B. C & D
C. A & D
D. B & C

**15. Which category/ies of wavelength division multiplexer comprise/s two 3dB couplers where the splitting of an incident beam takes place into two fiber paths, followed by the recombination with second 3-dB coupler?**

A. Interference filter based devices
B. Angular dispersion based devices
**C. Mach-Zehnder Interferometers**
D. All of the above

**16. Which among the following controls the length of Fabry-Perot interferometer so that it can act as a tunable optical filter?**

**A. Transducer**
B. Tachometer

C. Multimeter
D. Phase-meter

**17. In circulator, an optical path of signal follows _____**

A. An open loop
**B. A closed loop**
C. Both a and b
D. None of the above

**18. Which among the following is/are responsible for generating attenuation of an optical power in fiber?**

A. Absorption
B. Scattering
C. Waveguide effect
**D. All of the above**

**19. Consider the assertions/ characteristics given below. Which type of attenuation measurement technique exhibits these characteristics?**

1. Necessity of accessing both ends of fiber.
2. Measurements corresponding to specific wavelengths.
3. Requirement of spectral response over a range of wavelengths.

**A. Cutback Technique**
B. Insertion Loss Technique
C. Use of OTDR Technique
D. None of the above

**20. For neglecting the pulse dispersion in the digital systems, the rms width of fiber impulse response must be _____one-quarter of the pulse spacing.**

**A. Less than**
B. Equal to
C. Greater than
D. None of the above

**21. If a noisy channel has a bandwidth of 4 MHz with signal to noise ratio of about 1, what would be the maximum capacity of the channel?**

A. 2 Mb/sec
**B. 4 Mb/sec**
C. 6 Mb/sec
D. 8 Mb/sec

**22. In the structure of fiber optic cable, the refractive index of core is always _____the refractive index of cladding.**

A. Less than
B. Equal to
**C. Greater than**
D. None of the above

**23. The order of mode is equal to the number of field____ across the guide.**

**A. Zeros**
B. Poles
C. Ones
D. All of the above

**24. Which among the following represents the lateral shift of a light beam on reflection at a dielectric interface?**

A. Doppler's Shift
**B. Goos-Haenchen's Shift**
C. Frequency Shift
D. Phase Shift

**25. Why are plastic clad silica fiber optic cables not used widely?**

A. Difficulty in connector application due to excessive plasticity in cladding
B. Difficulty in bonding

C. Insolubility in organic solvents
**D. All of the above**

**26. In cables, water is prevented from filling the spaces with _____resistant compounds.**

**A. moisture**
B. pressure
C. temperature
D. stress

**27. Which reason/s is/are responsible for the occurrence of non-linear Cross Phase Modulation (XPM)?**

A. Difference in transmission phase of peak pulse & leading or trailing edges of pulse
B. Third-order optical non-linearity
**C. Intensity dependence of refractive index**
D. All of the above

**28. What is/ are the consequence/s of Self Phase Modulation in non-linear optics?**

A. Modification in pulse spectrum
B. Limited transmission rate
C. Dispersion effect
**D. All of the above**

**29. Which type of fiber-optic coupler causes the distribution of an optical power from more than two input ports among the several output ports?**

**A. Star Coupler**
B. Tree Coupler
C. X Coupler
D. All of the above

**30. Which optical devices are adopted or applicable for routing signals from one waveguide to another?**

A. Optical Combiner
B. Optical Splitter
**C. Optical Coupler**
D. None of the above

**31. Which among the following characteristics of Laser light specifies the precise movement of all individual light waves together through time and space?**

A. Monochromatic
B. Directional
**C. Coherent**
D. Brightness

**32. Which modes are acknowledged due to their association with electromagnetic field and beam profile in the direction perpendicular to the plane of pn junction?**

A. Longitudinal Modes
**B. Transverse Modes**
C. Lateral Modes
D. All of the above

**33. Which type of injection laser involves the use of geometry for fabrication of the multimode injection laser with a single or small number of lateral modes?**

**A. Gain guided laser**
B. Index guided laser
C. Quantum well laser
D. Quantum dot laser

**34. In the dynamic response of Injection Laser Diode (ILD), the delay which is followed by ____ frequency damped oscillations give rise to the generation of relaxation oscillations.**

A. Low
B. Medium

**C. High**
D. All of the above

**35. The spectral response of an ideal photodetector depicts its efficiency as a function of _____**

A. amplitude
B. frequency
C. period
**D. wavelength**

**36. According to frequency response of photo-detector, the modulation frequency at which the output current decreases to _____of peak value.**

A. one-third
B. one-fourth
**C. half**
D. one-tenth

**37. Which photo diodes are crucially applicable to overcome the bandwidth-quantum efficiency trade-off along with its resemblence to the pyramid structure?**

**A. Mushroom Waveguide Photodiode**
B. Traveling Wave Photodiode
C. Resonant Cavity Photodiode
D. All of the above

**38. When an optical signal is incident on a photo-detector, which noise originate/s due to statistical nature of production and collection of photoelectrons?**

A. Dark Current Noise
**B. Quantum Noise**
C. Surface Leakage Current noise
D. All of the above

**39. In an eye-diagram, digital signals with very bad interference resembles the shape of _____**

A. circle
B. rectangle
C. triangle
**D. straight line**

**40. On which factor/s do/does the response time of photodiode depend/s?**

A. Diffusion time of photo carriers outside the depletion region
B. Diffusion time of photo carriers within the depletion region
C. RC time constant
**D. All of the above**

**41. Which nature of charge carriers give rise to the current fluctuations thereby resulting into the generation of shot noise?**

A. Continuous
**B. Discrete**
C. Sampled
D. All of the above

**42. Which among the following parameters is/are decided by the front-end of a receiver?**

A. Sensitivity
B. Bandwidth
**C. Both a and b**
D. None of the above

**43. In an optical network, increase in the number of lasers _____the bit rate.**

**A. Increases**
B. Stabilizes
C. Decreases
D. None of the above

**44. Which band/s specify/ies the operation range of Erbium doped fiber amplifier (EDFA)?**

A. By O band
**B. By C band**
C. By S band
D. All of the above

**45. Basically, solitons are pulses which propagates through the fiber without showing any variation in _____**

A. Amplitude
B. Velocity
C. Shape
**D. All of the above**

**46. Why is an electrical isolation required between several portions of an electronic circuit?**

A. Provision of high voltage protection
B. Reduction in noise level
**C. Both a & b**
D. None of the above

**47. For measuring the shape of input pulse in time-domain intermodal dispersion method, the test fiber is replaced by another fiber whose length is less than ___ of the test fiber.**

**A. 1%**
B. 5%
C. 10%
D. 20%

**48. In chromatic dispersion, which parameter for the modulation of the received signal is measured with the help of a vector voltmeter?**

A. Amplitude
B. Frequency
**C. Phase**
D. Period

**49. Which among the following stages is/are adopted in Splice Loss Experiment?**

A. Translational
B. Rotational
**C. Both a and b**
D. None of the above

**50. Which among the following misalignments give/gives rise to the occurrence of splice loss?**

A. Longitudinal separation between the end-faces of fiber
B. Angular tilt between fiber ends
C. Transverse offset between fiber ends
**D. All of the above**

**51. In an optical fiber communication system, which among the following is not a typical transmitter function?**

A. Coding for error protection
B. Decoding of input data
C. Electrical to optical conversion
**D. Recoding to match output standard**

**52. Which among the following is provided by an optical receiver for the regeneration of data signal with minimum error?**

A. Photo-diode
B. Signal Processing Circuits
**C. Linear Circuitry**
D. None of the above

**53. For a sine wave, the frequency is represented by the cycles per _____**

**A. Second**
B. Minute

C. Hour
D. None of the above

**54. Which property/ies of PCM stream determine/s the fidelity to original analog signal?**

A. Sampling rate
B. Bit depth
**C. Both a and b**
D. None of the above

**55. In single-mode fibers, how does the fraction of energy traveling through bound mode appear in the cladding?**

A. As a crescent wave
B. As a gibbous wave
**C. As an evanescent wave**
D. All of the above

**56. What is the typical value of refractive index for an ethyl alcohol?**

A. 1
**B. 1.36**
C. 2.6
D. 3.4

**57. If a light travels in a certain medium and it gets reflected off an optically denser medium with high refractive index, then it is regarded as _____**

**A. External Reflection**
B. Internal Reflection
C. Both a and b
D. None of the above

**58. In an optical fiber, the concept of Numerical aperture is applicable in describing the ability of _____**

**A. Light Collection**
B. Light Scattering
C. Light Dispersion
D. Light Polarization

**59. Which among the following do/does not support/s the soot formation process?**

A. OVPO
B. MCVD
**C. PCVD**
D. All of the above

**60. Which type of photonic crystal fiber exhibit/s its/their similarity to the periodic crystalline lattice in a semiconductor?**

A. Index guiding fiber
**B. Photonic bandgap fiber**
C. Both a and b
D. None of the above

**61. Which type of fiber optic cable has/have its/their core with the size of about 480 µm to 980 µm & made up of polymethylmethacrylate (PMMA)?**

A. Glass fiber optic cable
**B. Plastic fiber optic cable**
C. Plastic clad silica fiber optic cable
D. All of the above

**62. In multifiber cable system, which form of outer jacket/s consist/s of polyolefin compounds and are regarded as halogen free?**

A. OFNR
B. OFNP
**C. LSZH**
D. All of the above

**63. During the design of FOC system, which among the following reasons is/are responsible for an extrinsic absorption?**

A. Atomic defects in the composition of glass
**B. Impurity atoms in glass material**
C. Basic constituent atoms of fiber material
D. All of the above

**64. Which among the following represent/s the measure/s to minimize the inhomogenities for Mie scattering reduction?**

A. Extrusion Control
B. Increase in relative R.I. difference
C. Removal of imperfections due to glass manufacturing process
**D. All of the above**

**65. In Kerr effect, induced index change has its proportionality with respect to _____**

**A. square of electric field**
B. cube of electric field
C. cube root of electric field
D. one-fourth power of electric field

**66. Which among the following is regarded as an inelastic scattering of a photon?**

A. Kerr Effect
**B. Raman Effect**
C. Hall Effect
D. Miller Effect

**67. Which kind/s of misalignment assist/s in the reduction of overlap region in fiber?**

A. Angular
B. Longitudinal
**C. Lateral**
D. All of the above

**68. Which is the correct order of sequential steps for an electric arc fusion technique?**

A. Pressing of fiber ends for fusion
B. Application of heat for smoothening of end-surfaces
C. Alignment of broken fiber edges

A. A, B, C
B. B, A, C
**C. C, B, A**
D. C, A, B

**69. Which splicing technique involves the alignment and locking of broken fiber edges by means of positioning devices & optical cement?**

A. Fusion
**B. Mechanical**
C. Both a and b
D. None of the above

**70. By using Springroove splicing technique, what is the value of mean insertion loss for multi mode graded index fiber?**

A. 0.01
B. 0.03
**C. 0.05**
D. 0.09

**71. In the fiber optic link, power transfer from one fiber to another and from fiber to detector must take place with _____coupling efficiency.**

**A. maximum**
B. stable
C. minimum
D. unpredictable

**72. In spontaneous emission, the light source in an excited state undergoes the transition to a state with _____**

A. Higher energy
B. Moderate energy
**C. Lower energy**
D. All of the above

**73. Which among the following is a key process adopted for the laser beam formation as it undergoes the light amplification?**

A. Spontaneous Emission
**B. Stimulated Emission**
C. Both a and b
D. None of the above

**74. While coupling of LEDs with fiber, on which factor/s does the size of source and lighting angle generated within the semiconductor depend/s?**

A. Geometry of die
B. Refractive index of semiconductor
C. Encapsulation Medium
**D. All of the above**

**75. Which among the following results in the removal of LED lens interface for achieving high coupling efficiency?**

A. Spherical lens
B. Cylindrical lens
**C. Integral lens LED**
D. All of the above

**76. For a photo-diode with responsivity of 0.50 A/W & optical power of about 12µW, what would be the value of generated photocurrent?**

A. 3 µA
**B. 6 µA**
C. 9 µA
D. 12 µA

**77. Which component of an optical receiver is a linear frequency shaping filter used for the compensation of signal distortion and Inter Symbol Interference (ISI)?**

A. Photodetector
B. Amplifier
**C. Equalizer**
D. None of the above

**78. In digital receivers, which codes are used to designate the sampled analog signals after their quantization into discrete levels?**

**A. Binary**
B. Decimal
C. ASCII
D. Excess-3

**79. Which feature of an eye-diagram assists in the measurement of additive noise in the signal?**

**A. Eye opening (height, peak to peak)**
B. Eye overshoot/ undershoot
C. Eye width
D. None of the above

**80. Which method determines the dispersion limitation of an optical link?**

A. Link power budget
**B. Rise time budget**
C. Both a and b
D. None of the above

**81. Which phenomenon causes the dynamic line width broadening under the direct modulation of injection current?**

A. Modal Noise
B. Mode-partition Noise
**C. Frequency Chirping**
D. Reflection Noise

**82. Speckle pattern is generated due to interference of nodes from a coherent source especially when the coherence time of source is _____ the intermodal dispersion time in the fiber.**

A. Less than
**B. Greater than**
C. Equal to
D. None of the above

**83. Which among the following is/are determined by the fiber characterization?**

A. Fiber integrity & performance for desired transmission rate
B. Installation practices
C. Service Implementation
**D. All of the above**

**84. From the tests carried out in fiber characterization, which among the following measures the total light reflected back to the transmitter caused by the fiber as well as the components like connector pairs and mechanical splices?**

**A. ORL**
B. OTDR
C. LTS
D. PMD

**85. In fiber fault location, the equation of length (l) for time difference (t) is expressed as L = ct / 2n1 . Which factor in this equation implies that the light travels a length from source to break point and then through another length on the return trip?**

A. L
B. c
C. t
**D. 2**

**86. Which line code in PCM indicates the return of signal to zero between each pulse & takes place even due to occurrence of consecutive 0's & 1's in the signal?**

**A. Return-to-zero (RZ)**
B. Non-Return to zero space
C. Return to zero inverted
D. Non-return to zero inverted

**87. In the structure of fiber, the light is guided through the core due to total internal _____**

**A. reflection**
B. refraction
C. diffraction
D. dispersion

**88. In the structure of a fiber, which component provides additional strength and prevents the fiber from any damage?**

A. Core
B. Cladding
**C. Buffer Coating**
D. None of the above

**89. Which is the transmission medium for VLF electromagnetic waves especially applicable for aeronautical and submarine cables?**

**A. Paired wires**
B. Coaxial cable
C. Waveguide
D. Wireless

**90. Which rays exhibit the variation in the light acceptability ability of the fiber?**

A. Meridional
**B. Skew**
C. Leaky
D. All of the above

**91. If a fiber operates at 1400nm with the diameter of about 10 µm, n1 = 1.30, Δ = 0.80% , V = 3.5, then how many modes will it have?**

**A. 6.125**
B. 9.655
C. 12.95
D. 16.55

**92. Which kind of dispersion phenomenon gives rise to pulse spreading in single mode fibers?**

**A. Intramodal**
B. Intermodal
C. Material
D. Group Velocity

**93. With respect to single mode and graded index fibers, which parameter specifies the propagation of polarization modes with different phase velocities & the difference between their effective refractive indices?**

A. Mode field diameter
**B. Birefringence**
C. Fiber beat length
D. Spot Size

**94. On which of the following factor/s do/does the 'Hydrogen Effect' depend/s?**

A. Type of fiber & Cable Design
B. Operating Wavelength
C. Installation Method
**D. All of the above**

**95. Consider the statements given below. Which among them is not a drawback of double crucible method?**

**A. Utility in mass production of fibers**
B. High attenuation
C. High OH content in drawn fiber
D. Addition of impurity while the fiber is drawn

**96. Consider the assertions given below. Which is the correct sequential order of process adopted in glass fiber preparation?**

A. Drawing of fiber
B. Production of pure glass
C. Pulling of fiber
D. Conversion of pure glass into preform

**A. B, D, A, C**
B. A, B, C, D
C. C, A, D, B
D. D, B, A, C

**97. At which level of temperature does the oxidation process occur in MCVD?**

A. Low
B. Moderate
**C. High**
D. Unpredictable

**98. Assuming no ISI, the maximum possible bandwidth of a multimode graded index fiber with 5 MHz, shows the total pulse broadening of 0.1s for the distance of about 12km. What would be the value of bandwidth length product?**

A. 40 MHz
**B. 60 MHz**
C. 90 MHz
D. 120 MHz

**99. In Rayleigh scattering of light in glass, at which type of temperature does the glass attain the state of thermal equilibrium and exhibits its relativity to annealing temperature?**

A. Junction
**B. Fictive**
C. Breakdown
D. Decomposition

**100. Which type of scattering occurs due to interaction of light in a medium with time dependent optical density variations thereby resulting into the change of energy (frequency) & path?**

A. Stimulated Brilliouin Scattering (SBS)
**B. Stimulated Raman Scattering (SRS)**
C. Mie Scattering
D. Rayleigh Scattering

# “Introduction and Applications of Laser”.

1. What is the full form of LASER?
a) Light Absorbent and Stimulated Emission of Radiations
b) Light Absorbing Solar Energy Resource
c) Light Amplification by Stimulated Emission of Radiations
d) Light Amplification of Singular Emission of Radiations
View Answer
Answer: c
Explanation: LASER is a short form of Light Amplification by Stimulated Emission of Radiations. Stimulated Emission is the process by which amplification of radiations takes place. Hence the meaning of LASER that the light is amplified by stimulating the emission of radiations.

2. In Stimulated Absorption, what is the lifetime of atoms ground state?
a) 1 second
b) 1 minute
c) 1 hour
d) Infinity
View Answer
Answer: d
Explanation: At the ground state, the atoms are perfectly stable. They are under no excessive force that might lead to become unstable. All the forces are balanced. Thus, as the atom is stable in ground state, its lifetime is infinity.

3. Phonons are _____
a) Quanta of energy
b) Quanta of light waves
c) Quanta of sound waves
d) Quanta of heat
View Answer

Answer: c
Explanation: Phonons are the quanta of sound waves. When energy is provided, the lattice absorbs energy and gets excited to a higher state. When it de-excites to ground state, it releases radiation in sound-wave region, known as phonons.

4. Which of the following is not a characteristic of LASERS?
a) Monochromatic
b) Coherent
c) Divergent
d) Intense
View Answer
Answer: c
Explanation: The lasers are highly directional having almost no divergence. The output beam of laser has a well-defined wave front due to which it can be focused on a point.
Lasers are highly intense compared to ordinary light. They are monochromatic and coherent.

5. Laser is used in LIDAR for what purpose?
a) High-Speed Photography
b) Range finder
c) Optical Carrier signal
d) Drilling
View Answer
Answer: b
Explanation: LIDAR stand for Light Detection and Ranging. Laser is used in LIDAR as range finder. The transit time of transmitted and reflected pulse of laser light is recorded and the distance of the reflecting object is estimated.

6. The output of a laser has pulse duration of 30 ms and average output power of 1 W per pulse. How much energy is released per pulse if wavelength is 6600 Å?
a) 0.001 J
b) 0.002 J
c) 0.003 J
d) 0.004 J
View Answer
Answer: c
Explanation: As we know, Energy = Power X Time

= 1 W X 30 X $10^{-3}$s
= 0.003 J.

7. Laser light from a 2mW source of aperture diameter 1.5 cm and wavelength 5000 Å is focused by a lens of focal length 20 cm. The intensity of the image is _____
a) 1.57 X $10^{6}$ $Wm^{-2}$
b) 2.57 X $10^{6}$ $Wm^{-2}$
c) 3.57 X $10^{6}$ $Wm^{-2}$
d) 4.57 X $10^{6}$ $Wm^{-2}$
View Answer
Answer: c
Explanation: Area of the image = $\pi\lambda^2 f^2 a^2$
λ = 5000 Å = 5.0 X $10^{-7}$m, f = 0.2 m
a = 1.5/2 cm = 0.75 X $10^{-2}$ m
Putting in the formula we get, Are = 5.6 X $10^{-10}$ $m^2$
Intensity = Power/Area
= 2 X $10^{-3}$W/ 5.6 X $10^{-10}$ $m^2$
= 3.57 X $10^{6}$ $Wm^{-2}$.

8. For an ordinary light source, the coherence time t = $10^{-10}$ s. The degree of Monochromaticity for a wavelength of 6000 Å is _____
a) 0.1 X $10^{-4}$
b) 0.2 X $10^{-4}$
c) 0.3 X $10^{-4}$
d) 0.4 X $10^{-4}$
View Answer
Answer: b
Explanation: Coherence time, t = $10^{-10}$ s
Therefore, Δv = 1/t = $10^{10}$ Hz
Now, $\lambda_o$ = 5000 Å, $v_o$ = 5.0 X $10^{14}$ Hz
Monochromaticity = $\delta v v_0$
= 0.2 X $10^{-4}$.

9. Lasers are used for welding of wires because they can be focused onto a fine spot.
a) True
b) False
View Answer

Answer: a
Explanation: Laser beams are highly directional with almost no convergence. Thus, they can be focused onto a fine spot with ease. Due to this, they are used in welding of fine wires, contacts in miniature assemblies, drilling holes etc.

10. Where is ND: YAG most commonly used?
a) Cosmetic Surgery
b) Welding
c) Photography
d) Optical Communications
View Answer
Answer: a
Explanation: ND: YAG is most commonly used for cosmetic energy because it has the property of maximum energy absorption by the target (hair or lesion) with minimum absorption by the surrounding skin structures.

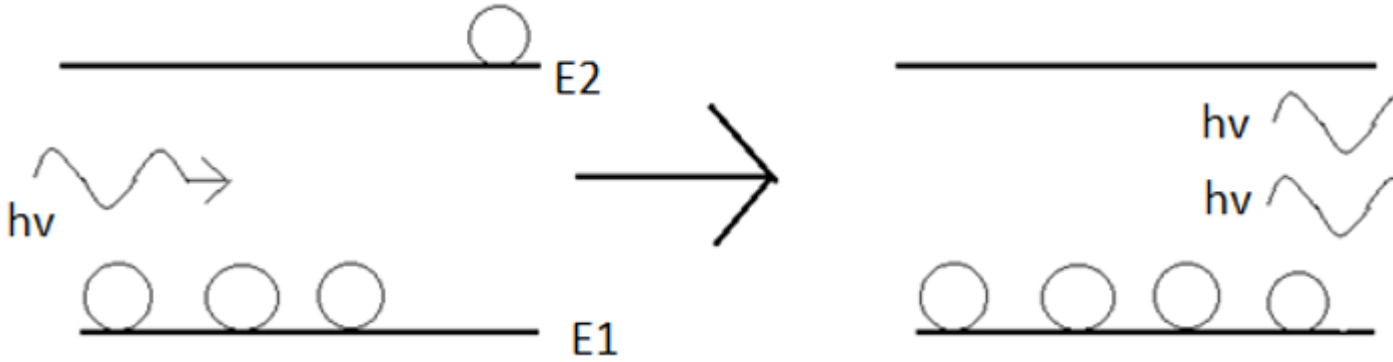
11. The information carrying capacity of laser is enormous due its large _____
a) Coherence
b) Bandwidth
c) Directionality
d) Intensity
View Answer
Answer: b
Explanation: Laser has a large bandwidth. The rate at which the information can be transmitted is proportional to bandwidth and the bandwidth is proportional to carrier frequency. Because of these properties, Laser is widely used as optical carrier signal.

12. Which characteristic of LASER allows it to be used in holography?
a) Coherency
b) Directionality
c) Intensity
d) Monochromaticity
View Answer
Answer: a
Explanation: The production of an image in a hologram takes place via a process called reconstruction. In this process, the image is

“reconstructed” in the form of a hologram. This reconstruction if possible, via LASER as they are highly coherent.

13. What is the region enclosed by the optical cavity called?
a) Optical Region
b) Optical System
c) Optical box
d) Optical Resonator
View Answer
Answer: d
Explanation: The optical cavity resembles an oscillator as it provides feedback of the photons by reflection, at the mirrors. Therefore, the area enclosed inside the optical cavity is called optical resonator.

14. The following graph is pictorial representation of _____




a) Spontaneous emission
b) Spontaneous Absorption
c) Stimulated emission
d) Stimulated Absorption
View Answer
Answer: c
Explanation: The diagram shows that when a photon from the incident radiation, having energy $E_2 – E_1$, interacts with the atom in excited state, the atom comes down to the ground state with the emission of a photon with same frequency, phase and direction of propagation.

## Laser Welding – 1

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This set of Manufacturing Processes Multiple Choice Questions & Answers (MCQs) focuses on “Laser Welding – 1”.

1. Laser beam welding is a _____ joining process.
a) fission
b) fusion
c) coherent
d) plastic
View Answer
Answer: b
Explanation: Laser is an acronym for light amplification by stimulated emission of radiation. Laser Beam Welding (LBW) is a fusion joining process that produces coalescence of materials with the heat obtained from a concentrated beam of coherent, monochromatic light impinging on the joint to be welded.

2. Which of the following is used to direct laser beam?
a) glass apertures
b) perforated glass sheets
c) flat optical elements
d) electro-magnetic coils
View Answer
Answer: c
Explanation: In the LBM process, the laser beam is directed by flat optical elements, such as mirrors and then focused to a small spot (for high power density) at the workpiece using either reflective focusing elements or lenses.

3. Inert gas shielding is generally employed to protect _____
a) laser beam
b) molten puddle of metal
c) filler electrode
d) lenses
View Answer
Answer: b
Explanation: It is a non-contact process, requiring no pressure to be applied. Inert gas shielding is generally employed to prevent oxidation of the molten puddle and filler metals may be occasionally used.

4. Which of the following is a commercially used laser?
a) Nd-GAG laser
b) 1.06 μm wavelength $CO_2$ laser
c) 2 μm wavelength $CO_2$ laser
d) Nd- YAS laser
View Answer
Answer: b
Explanation: The Lasers which are predominantly being used for industrial material processing and welding tasks are the Nd-YAG laser and 1.06 μm wavelength $CO_2$ laser, with the active elements most commonly employed in these two varieties of lasers being the neodymium (Nd) ion and the $CO_2$ molecules respectively.

5. In solid state laser _____ is used as a dopant.
a) actinium ion
b) neodymium ion
c) platinum ion
d) lead ion
View Answer
Answer: b
Explanation: It utilizes an impurity in a host material as the active medium. Thus, the neodymium ion (Nd+++) is used as a ‘dopant’, or purposely added impurity in either a glass or YAG crystal and the 1.06 μm output wavelength is dictated by the neodymium ion.

6. The lasing material is a cylinder of a diameter of about _____ mm.
a) 5
b) 9
c) 17
d) 20
View Answer
Answer: b
Explanation: The lasing material or the host is in the form of a cylinder of about 150 mm long and 9 mm in diameter. Both ends of the cylinder are made flat and parallel to each other.

7. The lasing material or crystal is excited by _____
a) neon lamps
b) krypton lamps
c) tungsten wire laps
d) CFLs
View Answer
Answer: b
Explanation: Both ends of the cylinder are made flat and parallel to very close tolerances, then polished to a good optical finish and silvered to make a reflective surface. The crystal is excited by means of an intense krypton or xenon lamps.

8. Which of the following laser is the most efficient?
a) $CO_2$ lasers
b) Nd-YAG lasers
c) Ruby lasers
d) Dye lasers
View Answer
Answer: a
Explanation: The electric discharge style $CO_2$ gas lasers are the most efficient type currently available for high power laser beam material processing. Dye lasers use complex organic dyes like rhodamine 6G.

9. $CO_2$ lasers employs gas mixture of _____
a) nitrogen and helium
b) hydrogen and helium
c) argon and xenon
d) oxygen and nitrogen
View Answer
Answer: a
Explanation: These lasers employ gas mixtures primarily containing nitrogen and helium along with a small percentage of carbon dioxide, and an electric glow discharge is used to pump this laser medium.

10. Gas heating produced by gas lasers is controlled by _____
a) coolant
b) a blow of cool air
c) adjusting the wavelength of the laser
d) circulating the gas mixture
View Answer
Answer: d
Explanation: Gas heating produced by gas lasers is controlled by continuously circulating the gas mixture through the optical cavity area and the thus CO2 lasers are usually categorized according to the type of gas flow in the system.

11. How many categorize are there of $CO_2$ lasers?
a) 2
b) 3
c) 4
d) 5
View Answer

Answer: b
Explanation: $CO_2$ laser are usually categorized according to the type of gas flow in the type of gas flow in the system:
• slow axial
• fast axial
• transverse axial.

12. Slow axial flow gas lasers are simplest of the $CO_2$ lasers.
a) True
b) False
View Answer
Answer: a
Explanation: They are the simplest of the $CO_2$ lasers. Gas flow in the same direction as the laser resonator's optical axis and electric excitation field, or gas discharge path. These lasers are capable of generating laser beams with a continuous power rating.

13. Solid axial flow $CO_2$ lasers can generate laser beams with a constant rating of 80 Watts.
a) True
b) False
View Answer
Answer: a
Explanation: These lasers can generate laser beams with a constant rating of approximately 80 Watts for every meter of discharge length. A folded tube configuration is used for achieving output power levels of 50 to 1000 Watts, maximum

# Laser Beam Machining – 1

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This set of Manufacturing Processes Multiple Choice Questions & Answers (MCQs) focuses on "Laser Beam Machining – 1".

1. Mechanism of material removal in Laser Beam Machining is due to _____
a) mechanical erosion due to impact of high of energy photons
b) electro-chemical etching
c) melting and vaporisation due to thermal effect of impingement of high energy laser beam
d) fatigue failure
View Answer
Answer: c
Explanation: Laser beam machining is carried out utilizing the energy of coherent photons or laser beam, which is mostly converted into thermal energy upon interaction with most of the materials.

2. Laser Beam is produced due to _____
a) spontaneous emission

b) stimulated emission followed by spontaneous emission
c) spontaneous emission followed by Spontaneous absorption
d) spontaneous absorption leading to “population inversion” and followed by stimulated emission
View Answer
Answer: d
Explanation: Lasing process describes the basic operation of laser, i.e. generation of a coherent (both temporal and spatial) beam of light by “light amplification” using “stimulated emission”.

3. Which of the following processes does not use lasers?
a) Cladding
b) Alloying
c) Nitriding
d) Cutting
View Answer
Answer: c
Explanation: Laser Beam Machining or more broadly laser material processing deals with machining and material processing like heat treatment, alloying, cladding, sheet metal bending, etc.

4. Lasers are also used for_____
a) riveting
b) nitriding
c) rapid prototyping
d) facing
View Answer
Answer: c
Explanation: Nowadays, laser is also finding application in regenerative machining or rapid prototyping as in processes like stereo-lithography, selective laser sintering etc.

5. Laser stands for light amplification by stimulated emission of radiation.
a) True
b) False
View Answer
Answer: a
Explanation: Laser stands for light amplification by stimulated emission of radiation. The underline working principle of a laser was

first put forward by Albert Einstein in 1917 through the first industrial laser for experimentation was developed around the 1960s.

6. Laser beams can have power density upto _____
a) 1 $kW/mm^2$
b) 10 $kW/mm^2$
c) 1 $MW/mm^2$
d) 10 $MW/mm^2$
View Answer
Answer: c
Explanation: Laser beam can very easily be focused using optical lenses as their wavelength ranges from half micron to around 70 microns. Focussed laser beam as indicated earlier can have power density in excess of 1 $MW/mm^2$.

7. Laser causes a rapid substantial rise in _____ of the material.
a) local temperature
b) local pressure
c) indentation
d) cracks
View Answer
Answer: a
Explanation: As laser interacts with the material, the energy of the photon is absorbed by the work material leading to rapid substantial rise in local temperature. This in turn results in melting and vaporisation of the work material and finally material removal.

8. At _____ temperature an atom is considered to be at ground level.
a) absolute zero
b) $0^oC$
c) $100^oC$
d) 100 K
View Answer
Answer: a
Explanation: Each of the orbital electrons is associated with unique energy levels. At absolute zero temperature an atom is considered to be at ground level when all the electrons occupy their respective lowest potential energy.

9. The electrons at ground state can be excited to a higher state of energy by _____

a) increasing the pressure
b) lowering the energy
c) absorbing the energy
d) oxidising the atom
View Answer
Answer: c
Explanation: The electrons at ground state can be excited to higher state of energy by absorbing energy form external sources like increase in electronic vibration at elevated temperature, through chemical reaction as well as via absorbing the energy of the photon.

10. The geometry and radii of orbital paths of electrons depend on the presence of an electromagnetic field.
a) True
b) False
View Answer
Answer: a
Explanation: In the model of an atom, negatively charged electrons rotate around the positively charged nucleus in some specified orbital paths. The geometry and radii of such orbital paths depend on a variety of parameters like number of electrons, presence of neighbouring atoms and their electron structure, presence of an electromagnetic field, etc

"Laser Beam Machining-Introduction".

1. What is the full form of LBM in advanced machining processes?
a) Laser Beam Manufacturing
b) Laser Beam Machining
c) Light Blast Manufacturing
d) Light Beam Machining
View Answer
Answer: b
Explanation: The full form of LBM is Laser Beam Machining in the advanced machining processes.

2. LBM offers a good solution for which material properties below?
a) Thermal conductivity
b) Specific heat
c) Boiling temperature
d) All of the mentioned
View Answer
Answer: d
Explanation: LBM offers good solution for material properties such as thermal conductivity, specific heat, melting and boiling temperatures.

3. What is the abbreviation of Laser?
a) Light allowed simple emission of radiation
b) Light amplification by stimulated emission of radiation

c) Light amplified simultaneous emission of rays
d) Light amplified stimulated emanation of rays
View Answer
Answer: b
Explanation: Full form of laser is Light Amplification by Stimulated emission of radiation.

4. Which of the following are the properties of a laser?
a) Highly collimated
b) Monochromatic
c) Coherent light beam
d) All of the mentioned
View Answer
Answer: d
Explanation: Highly collimated, high monochromaticity and the coherence of the light beam are the properties of a laser.

5. Laser beam machining uses which type of power sources for machining?
a) Very low power
b) Low power
c) Medium power
d) High power
View Answer
Answer: d
Explanation: High power densities are used for the generation of laser and for machining in Laser beam machining.

6. Which of the following are different types of lasers used in Laser beam machining?
a) Solid-state ion
b) Neutral gas
c) Semiconductor
d) All of the mentioned
View Answer
Answer: d
Explanation: Laser such as solid-state ion, neutral gas, molecular, semiconductor etc.., can be used in LBM.

7. Which types of lasers are used in Laser beam machining?
a) Continuous wave
b) Pulsed mode
c) Continuous wave & Pulsed mode
d) None of the mentioned
View Answer
Answer: c
Explanation: Laser may be in continuous wave (CW) or in Pulsed mode (PM) for machining in LBM.

8. What is the wavelength value of Ruby laser used in Laser beam machining?
a) 633 nm
b) 694 nm
c) 856 nm
d) 1064 nm
View Answer
Answer: b
Explanation: The value of wave length of Ruby laser used in Laser Beam machining is 694 nm.

9. What is the wavelength value of Nd-YAG and Nd-glass lasers used in LBM?
a) 633 nm
b) 694 nm
c) 856 nm
d) 1064 nm
View Answer

Answer: d
Explanation: The value of wave length of Nd-YAG and Nd-glass lasers used in LBM is 1064 nm.

10. What is the wavelength value of neutral gas laser used in LBM?
a) 633 nm
b) 694 nm
c) 856 nm
d) 1064 nm
View Answer
Answer: a
Explanation: The value of wave length of Neutral gas laser used in Laser beam machining is 633 nm.

11. What is the wavelength value of $CO_2$ laser used in Laser beam machining?
a) 0.16 μm
b) 1.6 μm
c) 10.6 μm
d) 106 μm
View Answer
Answer: c
Explanation: The value of wave length of $CO_2$ laser used in Laser Beam machining is 10.6 μm.

12. What are the values of wavelengths of GaAs laser used in LBM?
a) 100 – 200 nm
b) 200 – 400 nm
c) 600 – 700 nm
d) 800 – 900 nm
View Answer
Answer: d
Explanation: The wavelengths of GaAs laser used in LBM range from 800 – 900 nm.

13. What are the values of wavelengths of Excimer laser used in LBM?
a) 100 – 200 nm
b) 200 – 500 nm
c) 600 – 700 nm
d) 800 – 900 nm
View Answer
Answer: b
Explanation: The wavelengths of Excimer laser used in LBM range from 200 – 500 nm.

14. What are the values of wavelengths of Argon laser used in LBM?
a) 120 – 230 nm
b) 220 – 310 nm
c) 330 – 530 nm
d) 760 – 940 nm
View Answer
Answer: c
Explanation: The wavelengths of Argon laser used in LBM range from 330 – 530 nm

1-Material handling consists of movement of material from

one machine to another
one shop to another shop
stores to shop
all of the above
(Ans: d)

2-Economy in material handling can be achieved by

employing gravity feed movements
minimizing distance of travel
by carrying material to destination without using manual labour
all of the above
(Ans: d)

3-Principle of 'Unit load' states that

materials should be moved in lots
one unit should be moved at a time
both 'a' and 'b'
none of the above
(Ans: a)

4-Fork lift truck is used for

lifting and lowering
vertical transportation
both 'a' and 'b'
none of the above
(Ans: c)

5-Wheel barrows is used for

lifting and lowering
vertical transportation
both 'a' and 'b'
none of the above
(Ans: a)

6- Cranes are used for

lifting and lowering
vertical transportation

both ‘a’ and ‘b’
none of the above
(Ans: c)

7-Match the following

Device Purpose
A. Overhead crane 1. horizontal transportation
B. Pumps 2. lifting and lowering
C. chutes 3. lifting and transportation
The correct order is

A-2, B-1, C-3
A-1, B-2, C-3
A-3, B-2, C-1
A-2, B-3, C-1
(Ans: a)

8-Overbridge crane has

transverse movement
longitudinal movement
both ‘a’ and ‘b’
None of the above
(Ans: c)

9-The following is used to transport materials having flat bottoms

Belt conveyor
Roller conveyor
Chain conveyor
None of the above
(Ans: b)

10-The following is supported from the ceilings

Roller conveyor
Belt conveyor
Chain conveyor
All of the above
(Ans: c)

11-Special purpose material handling equipments are used in

Process layout
Line layout
both ‘a’ and ‘b’
None of the above
(Ans: b)

# Manufacturing science - Mechanical Engineering test questions

**1) Rotary swaging is used for**

a) Manufacturing bolts and rivers
b) Manufacturing seamless tubes
c) Flattening the surface
d) Reducing diameter of round bars and tubes by rotating die which opens and closes rapidly on the work

View Answer / Hide Answer

**ANSWER: d) Reducing diameter of round bars and tubes by rotating die which opens and closes rapidly on the work**

**2) Optimistation is a process of**

a) Maximisation of desirable quantity
b) Minimisation of an undesirable quantity

c) Both (a) and (b)
d) Analysis of an engineering system

View Answer / Hide Answer

**ANSWER: c) Both (a) and (b)**

**3) Linear programming is used in solving optimisation problems that involve**

a) Simplex objective functions
b) Linear objective functions
c) Non-linear objective functions
d) None of these

View Answer / Hide Answer

**ANSWER: b) Linear objective functions**

**4) When is tool life said to be over?**

a) A poor surface is obtained
b) Sudden increase in power and cutting force with chattering takes place
c) If overheating and fuming takes place
d) All of these

View Answer / Hide Answer

**ANSWER: d) All of these**

**5) How can heat generated in metal cutting be determined?**

a) Infra-red technique
b) Using radiation pyrometer
c) Calorimeter set up
d) None of these

View Answer / Hide Answer

**ANSWER: c) Calorimeter set up**

**6) How can the friction between tool and chip be reduced?**

a) Increasing shear angle
b) Increasing sliding velocity
c) Increasing rake angle
d) Using cooling medium

View Answer / Hide Answer

**ANSWER: b) Increasing sliding velocity**

**7) Slurry used in USM is**

a) Water based
b) Alkaline based
c) Alcohol based
d) Mercury based

View Answer / Hide Answer

**ANSWER: a) Water based**

**8) Erosion of metal in EDM is**

a) Continuous
b) Proportionate to the number of sparks
c) Either of these
d) None of these

View Answer / Hide Answer

**ANSWER: b) Proportionate to the number of sparks**

**9) Selection of proper tool material in EDM is influenced by**

a) Surface finish required
b) Volume of material to be removed
c) Tolerance required
d) None of these

View Answer / Hide Answer

**ANSWER: d) None of these**

**10) ……gases are used in Tungsten inert gas welding**

a) Argon and helium
b) Helium and neon
c) Hydrogen and neon
d) Carbon dioxide and hydrogen

View Answer / Hide Answer

**ANSWER: a) Argon and helium**

**11) LASER welding finds widest applications in**

a) Structural work
b) Heavy industry
c) Electronic industry
d) None of these

View Answer / Hide Answer

**ANSWER: c) Electronic industry**

**12) Coining is the operation of**

a) Hot forging
b) Piercing
c) Cold extrusion
d) Cold forging

View Answer / Hide Answer

**ANSWER: d) Cold forging**

**13) What is gear shaping related to?**

a) Forming
b) Hob
c) Generating
d) Template

View Answer / Hide Answer

**ANSWER: b) Hob**

**14) What does a 60 tonnes press implies?**

a) Weight of the press is 60 tonnes
b) It can handle work weighing upto 60 tonnes
c) It can exert pressure upto 60 tonnes
d) None of these

View Answer / Hide Answer

**ANSWER: c) It can exert pressure upto 60 tonnes**

**15) For soft material, the point angle of a drill is**

a) Kept at 112°
b) Decreased
c) Increased
d) Unchanged

View Answer / Hide Answer

**ANSWER: b) Decreased**

**16) Which among the following is an advantage of 'laser beam machining'?**

a) The workpiece is not subjected to large mechanical force
b) There is no contact between tool and workpiece
c) Any material can be welded
d) All the above

View Answer / Hide Answer

**ANSWER: d) All the above**

**17) Why are longitudinal waves preferred in ultrasonic machining?**

a) Are easily generated
b) Can travel at a high velocity
c) Can be propagated in solid, liquid and gases
d) All of these

View Answer / Hide Answer

**ANSWER: d) All of these**

**18) Negative rake is usually provided on**

a) High carbon steel tools
b) HSS tools
c) Cemented carbide tools
d) All of these

View Answer / Hide Answer

**ANSWER: c) Cemented carbide tools**

**19) Chip breakers are provided on the cutting tools**

a) For safety of operators
b) To minimise heat generation
c) To increase tool life
d) To permit short segmented chips

View Answer / Hide Answer

**ANSWER: d) To permit short segmented chips**

**20) In reverse polarity welding**

a) Electrode holder is connected to positive and work to negative
b) Work is negative and holder is earthed
c) Electrode holder is connected to negative and works to positive
d) Any of these

View Answer / Hide Answer

**ANSWER: a) Electrode holder is connected to positive and work to negative**

**21) The strength of a cutting tool depend on**

a) Clearance angle
b) Rake angle
c) Lip angle
d) All of these

View Answer / Hide Answer

**ANSWER: b) Rake angle**

**22) The purpose of side rake is**

a) To control chip flow
b) To shear of the metal
c) To break chips
d) None of these

View Answer / Hide Answer

**ANSWER: a) To control chip flow**

**23) Undercutting is the operation of cutting**

a) With a depth of cut
b) A deep groove
c) Below the specified size
d) A groove next to shoulder

View Answer / Hide Answer

**ANSWER: d) A groove next to shoulder**

**24) The function of a swab is**

a) To shake pattern to facilitate its withdrawal from the mould
b) To repair and finish the mould

c) To apply water to the mould around the edge of the pattern
d) All of these

View Answer / Hide Answer

**ANSWER: c) To apply water to the mould around the edge of the pattern**

**25) Refractories should have the following properties except**

a) High electrical conductivity
b) Long life
c) Minimum contraction and expansion due to temperature variation
d) Heat insulation

View Answer / Hide Answer

**ANSWER: a) High electrical conductivity**

**26) Padding is**

a) An extra support for thin castings
b) An extra metal welded to the original uniform section of the casting
c) A method for production of chilled castings
d) None of these

View Answer / Hide Answer

**ANSWER: b) An extra metal welded to the original uniform section of the casting**

**27) Skeleton patterns are used for**

a) Small castings
b) Large castings
c) Hollow castings
d) Non-ferrous castings

View Answer / Hide Answer

**ANSWER: b) Large castings**

**28) Design of gate should be such as to**

a) Avoid crosion of cores and mould cavity
b) Minimize turbulence and dross formation
c) Prevent scum, slag or eroded sand particles from entering the mould cavity
d) All of these

View Answer / Hide Answer

**ANSWER: d) All of these**

**29) Jigs and fixtures are used to**

a) Remove the chips.
b) Reduce cost of manufacture
c) Facilitate interchange ability, increasing productivity and accuracy
d) Increase productivity and allow rest time to operator

View Answer / Hide Answer

**ANSWER: c) Facilitate interchange ability, increasing productivity and accuracy**

**30) Tool signature is**

a) It is a numerical method of tool identification
b) It outlines the orthographic projection of tool
c) It is pictorial view of the tool
d) It represents complete specification of he tool

View Answer / Hide Answer

**ANSWER: a) It is a numerical method of tool identification**

# Optical Sources : Laser Basics

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This set of Optical Communications Multiple Choice Questions & Answers (MCQs) focuses on "Optical Sources : Laser Basics".

1. A device which converts electrical energy in the form of a current into optical energy is called as _____
a) Optical source
b) Optical coupler
c) Optical isolator
d) Circulator
View Answer
Answer: a
Explanation: An Optical source is an active component in an optical fiber communication system. It converts electrical energy into optical energy and allows the light output to be efficiently coupled into the Optical fiber.

2. How many types of sources of optical light are available?
a) One
b) Two
c) Three
d) Four
View Answer
Answer: c
Explanation: Three main types of optical light sources are available. These are wideband sources, monochromatic incoherent sources. Ideally the optical source should be linear.

3. The frequency of the absorbed or emitted radiation is related to difference in energy E between the higher energy state $E_2$ and the lower energy state $E_1$. State what h stands for in the given equation?
$E = E_2 - E_1 = hf$
a) Gravitation constant
b) Planck's constant
c) Permittivity
d) Attenuation constant
View Answer
Answer: b
Explanation: In the given equation, difference in the energy E is directly proportional to the absorbed frequency (f) where h is used as a constant and is called as Planck's constant. The value of h is measured in Joules/sec & is given by-
$h = 6.626 \times 10^{-34}$Js.

4. The radiation emission process (emission of a proton at frequency) can occur in _____ ways.
a) Two
b) Three
c) Four
d) One
View Answer
Answer: a
Explanation: The emission process can occur in two ways. First is by spontaneous emission in which the atom returns to the lower energy state in a random manner. Second is by stimulated emission where the energy of a photon is equal to the energy difference and it interacts with the atom in the upper state causing it to return to the lower state along with the creation of a new photon.

5. Which process gives the laser its special properties as an optical source?
a) Dispersion
b) Stimulated absorption
c) Spontaneous emission
d) Stimulated emission
View Answer
Answer: d
Explanation: In Stimulated emission, the photon produced is of the same energy to the one which cause it. Hence, the light associated with stimulated photon is in phase and has same polarization. Therefore, in contrast to spontaneous emission, coherent radiation is obtained. The coherent radiation phenomenon in laser provides amplification thereby making laser a better optical source than LED.

6. An incandescent lamp is operating at a temperature of 1000K at an operating frequency of $5.2\times10^{14}$ Hz. Calculate the ratio of stimulated emission rate to spontaneous emission rate.
a) $3\times10^{-13}$
b) $1.47\times10^{-11}$
c) $2\times10^{-12}$
d) $1.5\times10^{-13}$
View Answer
Answer: b
Explanation: The ratio of the stimulated emission rate to the spontaneous emission rate is given by-
Stimulated emission rate/ Spontaneous emission rate = 1/exp (hf/KT)-1.

7. The lower energy level contains more atoms than upper level under the conditions of _____
a) Isothermal packaging
b) Population inversion
c) Thermal equilibrium
d) Pumping
View Answer
Answer: c
Explanation: Under the conditions of thermal equilibrium, the lower energy level contains more atoms than the upper level. To achieve optical amplification, it is required to create a non-equilibrium distribution such that the population of upper energy level is more than the lower energy level. This process of excitation of atoms into the upper level is achieved by using an external energy source and is called as pumping.

8. _____ in the laser occurs when photon colliding with an excited atom causes the stimulated emission of a second photon.
a) Light amplification
b) Attenuation
c) Dispersion
d) Population inversion
View Answer
Answer: a
Explanation: Laser emits coherent radiation of one or more discrete wavelength. Lasers produce coherent light through a process called stimulated emission. Light amplification is obtained through stimulated emission. Continuation of this process creates avalanche multiplication.

9. A ruby laser has a crystal of length 3 cm with a refractive index of 1.60, wavelength 0.43 μm. Determine the number of longitudinal modes.
a) $1\times10^{2}$
b) $3\times10^{6}$
c) $2.9\times10^{5}$
d) $2.2\times10^{5}$
View Answer
Answer: d
Explanation: The number of longitudinal modes is given by-
$q = 2nL/\lambda$
Where
q = Number of longitudinal modes

n = Refractive index
L = Length of the crystal
λ = Peak emission wavelength.

10. A semiconductor laser crystal of length 5 cm, refractive index 1.8 is used as an optical source. Determine the frequency separation of the modes.
a) 2.8 GHz
b) 1.2 GHz
c) 1.6 GHz
d) 2 GHz
View Answer
Answer: c
Explanation: The modes of laser are separated by a frequency internal δf and this separation is given by-
$\delta f = c/2nL$
Where
c = velocity of light
n = Refractive index
L = Length of the crystal.

11. Doppler broadening is a homogeneous broadening mechanism.
a) True
b) False
View Answer
Answer: b
Explanation: Doppler broadening is a inhomogeneous broadening mechanism. In this broadening, the individual groups of atoms have different apparent resonance frequencies. Atomic collisions usually provide homogeneous broadening as each atom in collection has same resonant frequency and spectral spread.

12. An injection laser has active cavity losses of 25 $cm^{-1}$ and the reflectivity of each laser facet is 30%. Determine the laser gain coefficient for the cavity it has a length of 500μm.
a) 46 $cm^{-1}$
b) 51 $cm^{-1}$
c) 50 $cm^{-1}$
d) 49.07 $cm^{-1}$
View Answer
Answer: d
Explanation: The laser gain coefficient is equivalent to the threshold gain per unit length and is given by –
$g_{th} = \alpha + 1/L \ln (1/r)$
Where
α = active cavity loss
L = Length of the cavity
r = reflectivity.

13. Longitudinal modes contribute only a single spot of light to the laser output.
a) True
b) False
View Answer
Answer: a
Explanation: Laser emission includes the longitudinal modes and transverse modes. Transverse modes give rise to a pattern of spots at the output. Longitudinal modes give only a spot of light to the output.

14. Considering the values given below, calculate the mode separation in terms of free space wavelength for a laser. (Frequency separation = 2GHz, Wavelength = 0.5 μm)
a) $1.4\times10^{-11}$
b) $1.6\times10^{-12}$
c) $1\times10^{-12}$

d) $6\times10^{-11}$
View Answer
Answer: b
Explanation: The mode separation in terms of free space wavelength is given by-
$\delta\lambda = \lambda^2/c\ \delta f$
Where
$\delta f$ = frequency separation
$\lambda$ = wavelength
c = velocity of light

# HoloGraphy

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This set of Engineering Physics Multiple Choice Questions & Answers (MCQs) focuses on "HoloGraphy".

1. In holographic data storage, the information is stored in _____
a) Pendrives
b) Cells
c) Crystals
d) Diode
View Answer
Answer: c
Explanation: Holography is used in holographic data storage. In this method, all the data is stored in crystals or photopolymers. It is mostly used in electronic data storage devices.

2. The technique by which image is obtained from a hologram is called as _____
a) Formation
b) Construction
c) Reconstruction
d) Projection
View Answer
Answer: c
Explanation: The process of generation of an image from a hologram is called reconstruction. In the process, a wave called reconstruction wave illuminates the hologram, thus giving rise to the desired image.

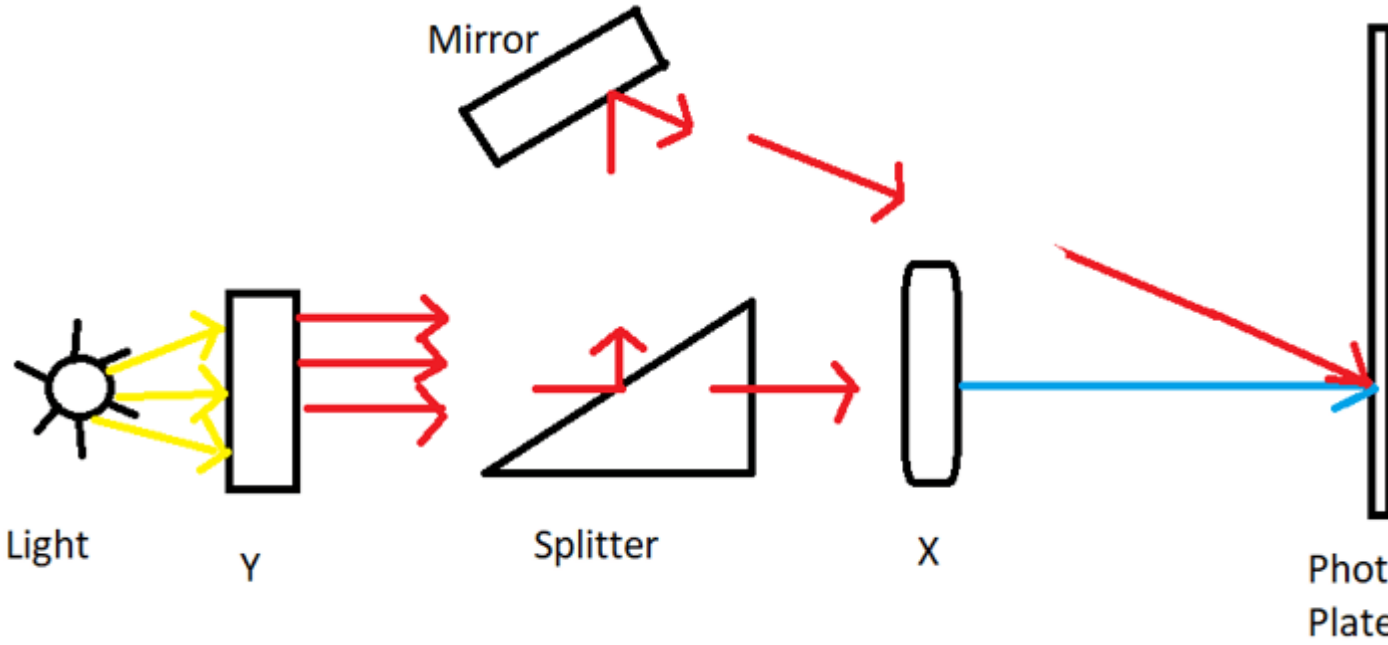
3. Which of the following is used for the formation of holograms?
a) X-ray
b) Visible Light
c) Infrared
d) Lasers
View Answer
Answer: d
Explanation: Laser is highly coherent. Due to this, they are widely used in the reconstruction process. In a hologram, each point contains light from the whole of the original scene.

4. It is not possible to break a hologram in small pieces.
a) True
b) False
View Answer
Answer: b
Explanation: Holograms can be broken into smaller pieces and they can be reconstructed to form the entire object. However, the size of the hologram is reduced, as the resolution decreases. The image starts to get blurred.

5. The information in the hologram exists in _____
a) Colored Image form
b) Black and white image form

c) 3-D image form
d) Coded form
View Answer
Answer: d
Explanation: All the information in a processed photographic plate, called hologram, exists in coded form. Information about the phase and the amplitude of the object wave is stored.

6. Identify X and Y.




a) X: Crystal, Y: Object
b) X: Object, Y: Crystal
c) X: Object, Y: Glass Slab
d) X: Glass Slab, Y: Object
View Answer
Answer: b
Explanation: In the figure, Y is the crystal and X is the object. This is the technique by which a hologram is created on the photographic plate. The process photographic plate contains information about the phase as well as the amplitude of the object wave.

7. Holography is based on the principle of _____
a) Interference
b) Diffraction
c) Interferometer
d) Polarization
View Answer
Answer: a
Explanation: The principle of interference is used in Holography. The interference pattern between two or more beams of coherent light or laser is captured by a hologram. The hologram captures light as it interests the whole area of the film.

8. When viewing a hologram print, the image changes as you move around.
a) True
b) False
View Answer
Answer: a
Explanation: As we know, a hologram contains light from the whole original scene. It records the scene through an area of perspective. Thus, as you move around, the image changes according to your position as well.

9. The principle of generation of the wavefront from an object from a hologram can be used for _____
a) Data Storage
b) Transient Microscopy
c) Interferometry
d) Pattern recognition
View Answer
Answer: d
Explanation: Holography can be used to identify fingerprints, postal addresses, etc. The wavefront from an object is generated from a hologram. The process is reversible and reference wave can be generated by object wave, which is the basis of character recognition.

10. The holograms found on credit-cards are an example of _____
a) Volume Holograms
b) Rainbow Holograms
c) Reflection Hologram
d) Hybrid hologram
View Answer
Answer: b
Explanation: Rainbow Hologram begins with a standard transmission hologram. These types of holograms are found on credit cards. They are designed to be viewed under white light illumination

## “Destructive and Non-Destructive Tests”

1. Which among the following is not a type of Non-destructive testing?
a) Compression test
b) Visual testing
c) Ultrasonic testing
d) Eddy current testing
View Answer
Answer: a
Explanation: Compression test is a type of destructive testing. This test is used to determine behavior of metals under compressive load. Visual testing, ultrasonic testing, eddy current testing are types of non-destructive testing.

2. Identify the type of destructive testing _____
a) Radiographic test
b) Dye penetrant test
c) Creep test
d) Visual testing
View Answer
Answer: c
Explanation: Creep test is a type of destructive test. It is defined as slow plastic deformation at high temperatures for a longer time under constant stresses. Creep occurs at room temperature and at high temperatures.

3. Which among the following is the last step in magnetic particle test method?
a) Observation and inspection
b) Circular magnetization
c) Demagnetization
d) Magnetization
View Answer
Answer: c
Explanation: Different steps involved in magnetic particle test are cleaning the surface, magnetizing the metallic component, application of ferromagnetic powder, observation and inspection and demagnetization.

4. Which of the following statements is/are true for the ultrasonic test?
a) Equipment used for ultrasonic testing is portable
b) Complicated shapes can be easily scanned
c) Waves generated are health hazardous
d) Waves generated are health hazardous and complicated shapes can be easily scanned
View Answer
Answer: a
Explanation: Ultrasonic test uses sound waves of high frequency to detect discontinuities. This method is used to detect flaws on the surface and also deep inside the component. The waves travel in straight line and are reflected from metal gas interface or discontinuities in their patch.

5. Which test can be performed without skilled labour?
a) Probe test
b) Bend liquid test
c) Dye penetrant test
d) Torsion test
View Answer
Answer: c
Explanation: Dye penetrant test does not require any skilled labour. This method only detects surface discontinuities and this test needs to be observed with naked eyes or with a low magnifying glass.

6. What is nondestructive test?
a) Nondestructive tests are applications for detecting flaws in

materials without impairing their usefulness
b) Nondestructive tests are applications for detecting flaws that impair the use of the materials such as pressure testing
c) Nondestructive tests are applications for detecting flaws in materials with impairing their usefulness
d) Nondestructive tests are applications for detecting flaws that do not impair the use of the materials such as pressure testing
View Answer
Answer: a
Explanation: Nondestructive tests are applications for detecting flaws in materials without impairing their usefulness.

7. What is a destructive test?
a) Destructive tests are applications for detecting flaws in materials without impairing their usefulness
b) Destructive tests are applications for detecting flaws that impair the use of the materials such as pressure testing
c) Destructive tests are applications for detecting flaws in materials with impairing their usefulness
d) Destructive tests are applications for detecting flaws that do not impair the use of the materials such as pressure testing
View Answer
Answer: b
Explanation: Destructive tests are applications for detecting flaws that impair the use of materials such as pressure testing

“Laser”.

1. Which of the following is a unique property of laser?
a) Directional
b) Speed
c) Coherence
d) Wavelength
View Answer
Answer: c
Explanation: Coherence is an important characteristic of laser beam because in laser beams, the wave trains of the same frequency are in phase/ Due to high coherence it results in extremely high power.

2. Which of the following is an example of optical pumping?
a) Ruby laser

b) Helium-Neon laser
c) Semiconductor laser
d) Dye laser
View Answer
Answer: a
Explanation: The atoms of Ruby are excited with the help of photons emitted by an external optical source. The atoms absorb energy from photos and raises to excited state. Therefore Ruby laser is an example of optical pumping.

3. When laser light is focussed on a particular area for a long time, then that particular area alone will be heated.
a) True
b) False
View Answer
Answer: a
Explanation: Laser beam has very high intensity, directional properties and coherence. When it is focussed on a particular area for a long time, then the area alone will be heated and the other area will remain as such. This is called thermal effect.

4. Calculate the wavelength of radiation emitted by an LED made up of a semiconducting material with band gap energy 2.8eV.
a) 2.8 Å
b) 4.3308 Å
c) 5548.4 Å
d) 4430.8 Å
View Answer
Answer: d
Explanation: E = hc/ʎ
Therefore, ʎ = hc/E
ʎ = 4430.8 Å.

5. Calculate the number of photons, from green light of mercury (ʎ = 4961 Å), required to do one joule of work.
a) $4524.2\times10^{18}/m^3$
b) $2.4961\times10^{18}/m^3$
c) $2.4961/m^3$
d) 2.4961/m
View Answer

Answer: b
Explanation: E = hc/ʎ
E = $4.006 \times 10^{-19}$ Joules
Number of photons required = (1 Joule)/($4.006 \times 10^{-19}$)
N = $2.4961 \times 10^{18}/m^3$.

6. Which of the following can be used for the generation of laser pulse?
a) Ruby laser
b) Carbon dioxide laser
c) Helium neon laser
d) Nd- YAG laser
View Answer
Answer: d
Explanation: Since Nd YAG laser has a higher thermal conductivity than other solid state lasers, it lends itself for the generation of laser pulses at a higher pulse repetition rate or a quasi continuous wave operation.

7. What is the need to achieve population inversion?
a) To excite most of the atoms
b) To bring most of the atoms to ground state
c) To achieve stable condition
d) To reduce the time of production of laser
View Answer
Answer: a
Explanation: When population inversion is achieved, the majority of atoms are in the excited state. This causes amplification of the incident beam by stimulated emission. Thus the laser beam is produced.

8. Laser is called as a non-material knife.
a) False
b) True
View Answer
Answer: b
Explanation: In laser surgery, without knife, bloodless operation, cutting tissues etc can be made, hence laser is called non-material knife.

9. DVD uses the laser.
a) True

b) False
View Answer
Answer: a
Explanation: A DVD player contains a laser. By moving the lens longitudinally, different depths can be reached in the disc. In order to make room for a lot of information on every disc, the beam has to be focused on as small an area as possible. This cannot be done with any other light source.

10. Which of the following is used in atomic clocks?
a) Laser
b) Quartz
c) Maser
d) Helium
View Answer
Answer: c
Explanation: Before laser maser was used. It stood for microwave amplification by stimulated emission of radiation. This was based on Albert Einstein's principle of stimulated emission. It was used in the atomic clock.

11. Which of the following can be used in the vibrational analysis of structure?
a) Maser
b) Quarts
c) Electrical waves
d) Laser
View Answer
Answer: d
Explanation: Laser can be used in the vibrational analysis of the structure. This is because when a structure under test begins to vibrate a distinctive pattern begins to emerge

laser, ruby laser and helium neon laser

I. What is the pumping source in Ruby laser?

Electrical Pumping

Optical

Chemical

None of the above
II. What is the output in wavelength of ruby laser?

6943 angstroms
6328 angstroms
5400 angstroms
8000 angstroms
III. Is Ruby laser a gas laser?

True
false
IV. What is the pumping source in Helium – Neon laser?

Electrical Pumping
Optical
Chemical
None of the above
V. What is the output in wavelength of Helium-Neon laser?

6943 angstroms
6328 angstroms
5400 angstroms
8000 angstroms
VI. Ruby laser is a _____ level laser.

Three
Four
Five
Two
VII. Helium-Neon laser is a _____ level laser.

Three
Four

Five
Two
VIII. In LASER, S stands for:

Spontaneous
Stimulated
Simultaneously
None of the above
IX. Laser medium in Ruby laser is:

Aluminium oxide
Chromium oxide
Chromium oxide doped with aluminium ions
Aluminium oxide doped with chromium ions
X. Which laser has continuous output?

Ruby laser
Helium-Neon laser
Both
None of the above
Answers: I. (2), II (1), III(2), IV(1), V(2), VI(1), VII (2), VIII (2), IX (4), X(2)

SARANATHAN COLLEGE OF ENGINEERING, TRICHY-12
Department of Electrical and Electronics Engineering
8th Semester - EEE
GE8076 - Professional Ethics in Engineering

## UNIT-I

1) **Which of the following is not in Senses of Engineering Ethics? Ans(d)**
   (a) Activity and area of Inquiry
   (b) Understanding moral values
   (c) Resolving moral issues
   (d) Justifying personal issues

2) **Which is not one of the three types of inquiry Ans(d)**
   (a) Normative
   (b) Conceptual
   (c) Factual
   (d) Informal

3) **Moral dilemmas are not Ans(d)**
   (a) Conflicting obligation and duties
   (b) Conflicting duties and rights
   (c) Conflicting rights and ideals
   (d) Conflicting ideals and personal wishes

4) **Which of the following is not a characteristic of a Profession Ans (d)**
   (a) Knowledge
   (b) Organization
   (c) Public good
   (d) Personal good

5) **Moral autonomy is not Ans (d)**
   (a) Showing concerns for other people
   (b) Self determination
   (c) Moral beliefs based on critical reflection
   (d) Passive adoption of the conventions of the society or profession

6) **Identify the characteristic of Giligan's Theory on moral development : Ans (d)**

   (a) Justice
   (b) Factual
   (c) Logic and rule based
   (d) More of caring

**7) In order to save his wife ,Heinz forcibly entered the Pharmacy and stole the drug. According to Kohlberg about this incident : Ans (a)**

(a) Heinz was wrong
(b) Heinz was right
(c) He could have tried other solutions
(d) Solution should be based on the basis of context

**8) When moral rights are violated we apply Ans(d)**
(a) Virtue ethics
(b) Utilitarionism
(c) Duty ethics
(d) Rights ethics

**9) Which ethics is appropriate for the statement "We ought to produce the most good for the most people" Ans(b)**
(a) Virtue ethics
(b) Utilitarianism
(c) Duty ethics
(d) Rights ethics

**10) The maxim "Keep your promises" comes under Ans(b)**
(a) Rule Utilitarianism
(b) Act Utilitarianism
(c) Duty ethics
(d) Rights ethics

**11) Which of the following is relevant for the statement "Actions are morally right when they are approved by law or custom" Ans(b)**

(a) Ethical pluralism
(b) Ethical relativism
(c) Descriptive relativism
(d) Moral relationalism

**12) Which of the following has moral reasons to support? Ans(c)**
(a) Not respecting others
(b) Not keeping promises
(c) Respecting the rights of others
(d) Cheating and dishonesty

**13) Which of the following is not a good engineering decision? Ans(a)**

(a) Not ensuring product safety
(b) Ensuring reliability
(c) Providing user friendliness
(d) Providing Environment friendliness

**14) Micro ethics deals with Ans(b)**

(a) Societal problems
(b) Every day problems
(c) Unknown problems
(d) Problems at National level

## UNIT-II

**1) Which one contradicts with Standard Experiments? Ans(d)**

(a) Partial Ignorance
(b) Uncertainty
(c) Knowledge Gained
(d) Informed Consent

**2) Which of the following is not pertinent from the perspective of engineers as responsible experimentor? Ans(b)**

(a) Conscientiousness
(b) Non-autonomous
(c) Safety of human subjects
(d) Accountability

**3) Which of the following is not true with respect to Titanic disaster? Ans(a)**

(a) Adequate Life boats
(b) Ship sailed at high speed in the night
(c) It had hit against an ice berg
(d) The ship tore into two parts due to hitting against iceberg

**4) Which of the following is not feature of an engineering project? Ans(a)**

(a) Experimental Control
(b) Outcome Uncertain
(c) Learning from the past
(d) Partial Ignorance

**5) Which is not the feature of Industrial Standardst? Ans(d)**

(a) Interchangeability
(b) Safety
(c) Quality
(d) Trademark

**6) Which one is the factual issue in the space shuttle Challenger Accident? Ans(d)**

(a) No escape mechanism
(b) No Informed Consent
(c) No Warning Signal
(d) Field Joint gave away

**7) Identify a factor that does not influence perception of risk. Ans(d)**

(a) No escape mechanism
(b) No Informed Consent
(c) No Warning Signal
(d) Field Joint gave away

**8) Which of the following is not true in Challenger Accident? Ans(a)**

(a) Engineer's concern on Safety is followed
(b) Informed consent was not obtained
(c) No back up or standby for critical components
(d) Safe exit not incorporated

**9) Which of the following is not true in Chernobyl nuclear reactor disaster? Ans(a)**

(a) Operators had disconnected emergency core cooling system
(b) Operators had blocked all emergency signals
(c) The reactor core melted and the radioactive waste began to spread
(d) No loss of lives in this accident

## UNIT-*III*

**1) Which of the following is more appropriate for the statement ,"Potential that something harmful may occur" : Ans(b)**

(a) Defintion of safety
(b) Definition of risk
(c) Definition of acceptable risk
(d) Uncertainty about a product's life

**2) Which of the following recommended while considering safety and risk? Ans(d)**

(e) Underestimation of risk
(f) Overestimation of risk
(g) No judgement on risk
(h) Risks fully known & judged acceptable in the light of settled value principles

**3) Identify a factor that does not influence perception of risk. Ans(d)**

(i) Probability of risk
(j) Consequence of risk
(k) Magnitude
(l) Non-job related

**4) Which one of the following is not feature of risk acceptance? Ans(d)**

(a) Allow the product fail safely
(b) Provide safe escape from site
(c) Abandon it safely
(d) Over confidence on safety of the product

**5) Which one of the following is not feature of risk acceptance? Ans(b)**

(a) Function testing
(b) Destructive testing
(c) Prototype testing
(d) Simulation testing

**6) A deductive method to identify the cause of the failure. Ans(c)**

(a) Scenario Analysis
(b) Failure Mode and Effect Analysis
(c) Fault-Tree-Analysis
(d) Event-Tree-Analysis

**7) Event-Tree-Analysis not characterized by Ans(d)**

(a) Inductive logic
(b) Consequence analysis
(c) Proceed forward in time to final accident
(d) Proceed back in time for catastrophic accident

**8) Which is not true in the following regarding risk benefit analysis situation? Ans(d)**

(a) Benefit may go to one group and risk may go to another group
(b) Units of comparison are not the same
(c) Future benefits using discounted present value may not be correct
(d) People exposed to maximum risks may get maximum benefits

**9) Which of the following is ideal risk , a product design can take considering the costs involved in providing safety? Ans(d)**

(a) Low risk & high safety
(b) High risk & low safety
(c) Point of Minimum total cost
(d) Highest Acceptable risk

**10) Which of the following is not recommended in providing safety in nuclear power plants? Ans(c)**

(a) Learning from the past
(b) Periodic mock drill of emergency
(c) Bypassing all controls
(d) People in the neighborhood should be informed about safety concerns & risk

## UNIT-*IV*

**1) Identify the loyalty related to fulfill one's contractual duties to an employee. Ans(a)**

(a) Agency-Loyalty
(b) Identification Loyalty
(c) Misguided Loyalty
(d) Attitude Loyalty

**2) An element of collegiality that value one's peers for their professional expertise Ans(d)**

(a) Commitment
(b) Connectedness
(c) Co-operation
(d) Respect

**3) A right to exercize certain kinds of power. Ans(a)**

(a) Institutional authority
(b) Expert Authority
(c) Institutional duty
(d) Morally-Justified right

**4) As per the code of ethics , an engineer's paramount obligation is to protect : Ans(c)**

(a) Loyalty
(b) Service to employers
(c) Public safety, health and welfare
(d) Personal welfare

**5) Which one of the following strongly implies bribe? Ans(b)**

(a) Made in open
(b) Made in secret
(c) Given after a favor
(d) Causes no damage in goodwill

**6) A situation when a person is working as an employee for two different companies : Ans(c)**

(a) Industrial Espionage
(b) Bootlegging
(c) Moonlighting
(d) Endangering lives

**7) Conveying information by an employee, on an important moral problem to somebody to take action Ans(b)**

(a) Industrial Espionage
(b) Whistle Blowing
(c) Moonlighting
(d) Endangering lives

**8) Which one is not an aspect of Whistle Blowing? Ans(d)**

(a) Relevance of Topic
(b) Agent
(c) Recepient
(d) Approved organizational channel

**9) Whistle blowing is not justified one of the following : Ans(b)**

(a) Potential harm is serious
(b) Sufficient data on harm is not available
(c) Concerns already reported earlier to immediate supervisor
(d) Remedy for the damage is existing

**10) Legal protection of one's product being manufactured or sold to others is called a : Ans(c)**

(a) Trade mark
(b) Trade secret
(c) Patent
(d) Copy right

**11) An employee or former employee conveys information about a significant moral problem concealing one's identity is known as : Ans(c)**

(a) External whistle blowing
(b) Internal whistle blowing
(c) Anonymous whistle blowing
(d) Open whistle blowing

## UNIT-*V*

**1) The process of moving technology to a new setting and implementing there : Ans(b)**

(a) Appropriate Technology
(b) Technology transfer
(c) Intermediate Technology
(d) Advanced Technology

**2) Large emission of sulphur oxides and nitrous oxides that forms compounds with water in air causes : Ans(b)**

(a) Global Warming
(b) Acid Rain

(c) Depletion of Ozone layer
(d) Green House Effect

**3) Lawyers are permitted and required to project the case favorable to their clients using : Ans(d)**

(a) Money bias
(b) Ego bias
(c) Sympathy bias
(d) Hired guns

**4) Which of the following is appropriate for the statement " Actions are morally right when they are approved by law , custom etc" : Ans(b)**

(a) Descriptive Relativism
(b) Ethical Relativism
(c) Moral Relativism
(d) Ethical Pluralism

**5) Which one is beneficial to the participating country when foreign countries are doing business in developing countries? : Ans(d)**

(a) Inexpensive labour
(b) Availability of natural resources
(c) Fresh market for products
(d) Jobs with high pay and greater challenge

**6) Which one is not recommended when wealthy countries do business in less economically developed countries? : Ans(a)**

(a) Simply adopt country's safety laws
(b) Informed Consent
(c) Pay more for extra risks
(d) Promoting most good for most people

**7) Which ethics is appropriate for the statement "While building a dam engineers should take into account the impact on animals living there" : Ans(c)**

(a) Biocentric ethics
(b) Ecocentric ethics
(c) Sentient centered ethics
(d) Human centered environment ethics

**8) What principle is implied from the statement "Separate the people from the problem" : Ans(b)**

(a) Promoting ethical climate
(b) Resolving conflicts
(c) Ethical responsibility to produce safe and good products
(d) Making risk taking decisions involving wider range of products

**9) Which of the following is not preferred for conflict resolution? : Ans(d)**

(a) Focus on interest, not position
(b) Generate variety of possibilities to choose
(c) Criteria based on standard
(d) Win-Lose styles

**10) Which one ranks low among the following conflicts? : Ans(c)**

(a) Conflict over schedules
(b) Conflict over personal resources
(c) Personality Conflicts
(d) Conflict over technical uses

**11) Which kind of advertising are not prohibited? : Ans(d)**

(a) White lies
(b) Half truth
(c) Making false suggestions
(d) Clear wordings or apt slogans

**12) While evaluating role of engineers as consultants " The younger consultants are slightly at disadvantage at" : Ans(b)**

(a) Advertising
(b) Competitive Bidding
(c) Contingency Fees
(d) Safety and Clients' needs

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**IC8451- CONTROL SYSTEMS**
**OBJECTIVE TYPE QUESTIONS**
**Regulation: 2017, Even Semester**

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1. In an open loop control system
(a) Output is independent of control input
(b) Output is dependent on control input
(c) Only system parameters have effect on the control output
(d) None of the above
**Ans: a**

2. For open control system which of the following statements is incorrect ?
(a) Less expensive
(b) Recalibration is not required for maintaining the required quality of the output
(c) Construction is simple and maintenance easy
(d) Errors are caused by disturbances
**Ans: b**

3. A control system in which the control action is somehow dependent on the output is known as
(a) Closed loop system
(b) Semiclosed loop system
(c) Open system
(d) None of the above
**Ans: a**

4. In closed loop control system, with positive value of feedback gain the overall gain of the system will
(a) decrease
(b) increase
(c) be unaffected
(d) any of the above
**Ans: a**

5. Which of the following is an open loop control system ?
(a) Field controlled D.C. motor
(b) Ward leonard control
(c) Metadyne
(d) Stroboscope
**Ans: a**

6. Which of the following statements is not necessarily correct for open control system ?
(a) Input command is the sole factor responsible for providing the control action
(b) Presence of non-linearities causes malfunctioning
(c) Less expensive
(d) Generally free from problems of non-linearities

Ans: b

7. In open loop system
(a) the control action depends on the size of the system
(b) the control action depends on system variables
(c) the control action depends on the input signal
(d) the control action is independent of the output
Ans: d

8 has tendency to oscillate.
(a) Open loop system
(b) Closed loop system
(c) Both (a) and (b)
(d) Neither (a) nor (b)
Ans: b

9. A good control system has all the following features except
(a) good stability
(b) slow response
(c) good accuracy
(d) sufficient power handling capacity
Ans: b

10. A car is running at a constant speed of 50 km/h, which of the following is the feedback element for the driver ?
(a) Clutch
(b) Eyes
(c) Needle of the speedometer
(d) Steering wheel
(e) None of the above
Ans: c

11. The initial response when the output is not equal to input is called
(a) Transient response
(b) Error response
(c) Dynamic response
(d) Either of the above
Ans: a

12. A control system working under unknown random actions is called
(a) computer control system
(b) digital data system
(c) stochastic control system
(d) adaptive control system
Ans: c

13. An automatic toaster is a_____loop control system.
(a) open
(b) closed
(c) partially closed
(d) any of the above
Ans: a

14. Any externally introduced signal affecting the controlled output is called a
(a) feedback
(b) stimulus
(c) signal
(d) gain control
Ans: b

15. A closed loop system is distinguished from open loop system by which of the following ?
(a) Servomechanism
(b) Feedback
(c) Output pattern
(d) Input pattern
Ans: b

16 is a part of the human temperature control system.
(a) Digestive system
(b) Perspiration system
(c) Ear
(d) Leg movement
Ans: b

17. By which of the following the control action is determined when a man walks along a path ?
(a) Brain
(b) Hands
(c) Legs
(d) Eyes
Ans: d

18 is a closed loop system.
(a) Auto-pilot for an aircraft
(6) Direct current generator
(c) Car starter
(d) Electric switch
Ans: a

19. Which of the following devices are commonly used as error detectors in instruments ?
(a) Vernistats

(b) Microsyns
(c) Resolvers
(d) Any of the above
Ans: d

20. Which of the following should be done to make an unstable system stable ?
(a) The gain of the system should be decreased
(b) The gain of the system should be increased
(c) The number of poles to the loop transfer function should be increased
(d) The number of zeros to the loop transfer function should be increased
Ans: b

21 increases the steady state accuracy.
(a) Integrator
(b) Differentiator
(c) Phase lead compensator
(d) Phase lag compensator
Ans: a

22. A.C. servomotor resembles
(a) two phase induction motor
(b) Three phase induction motor
(c) direct current series motor
(d) universal motor
Ans: a

23. As a result of introduction of negative feedback which of the following will not decrease ?
(a) Band width
(b) Overall gain
(c) Distortion
(d) Instability
Ans: a

24. Regenerative feedback implies feedback with
(a) oscillations
(b) step input
(c) negative sign
(d) positive sign
Ans: d

25. The output of a feedback control system must be a function of
(a) reference and output
(b) reference and input
(e) input and feedback signal
(d) output and feedback signal

Ans: a

26 is an open loop control system.
(a) Ward Leonard control
(b) Field controlled D.C. motor
(c) Stroboscope
(d) Metadyne
Ans: b

27. A control system with excessive noise, is likely to suffer from
(a) saturation in amplifying stages
(b) loss of gain
(c) vibrations
(d) oscillations
Ans: a

28. Zero initial condition for a system means
(a) input reference signal is zero
(b) zero stored energy
(c) ne initial movement of moving parts
(d) system is at rest and no energy is stored in any of its components
Ans: d

29. Transfer function of a system is used to calculate which of the following ?
(a) The order of the system
(b) The time constant
(c) The output for any given input
(d) The steady state gain
Ans: c

30. The band width, in a feedback amplifier.
(a) remains unaffected
(b) decreases by the same amount as the gain increase
(c) increases by the sane saaaajajt as the gain decrease
(d) decreases by the same amount as the gain decrease
Ans: c

31. On which of the following factors does the sensitivity of a closed loop system to gain changes and load disturbances depend ?
(a) Frequency
(b) Loop gain
(c) Forward gain
(d) All of the above
Ans: d

32. The transient response, with feedback system,

(a) rises slowly
(b) rises quickly
(c) decays slowly
(d) decays quickly
Ans: d

33. The second derivative input signals modify which of the following ?
(a) The time constant of the system
(b) Damping of the system
(c) The gain of the system
(d) The time constant and suppress the oscillations
(e) None of the above
Ans: d

34. Which of the following statements is correct for any closed loop system ?
(a) All the co-efficients can have zero value
(6) All the co-efficients are always non-zero
(c) Only one of the static error co-efficients has a finite non-zero value
(d) None of the above
Ans: c

35. Which of the following statements is correct for a system with gain margin close to unity or a phase margin close to zero ?
(a) The system is relatively stable
(b) The system is highly stable
(c) The system is highly oscillatory
(d) None of the above
Ans: c

36. Due to which of the following reasons excessive bond width in control systems should be avoided ?
(a) It leads to slow speed of response
(b) It leads to low relative stability
(c) Noise is proportional to band width
(d) None of the above
Ans: c

37. In a stable control system backlash can cause which of the following ?
(a) Underdamping
(b) Overdamping
(c) Poor stability at reduced values of open loop gain
(d) Low-level oscillations
Ans: d

38. In an automatic control system which of the following elements is not used ?
(a) Error detector

(b) Final control element
(c) Sensor
(d) Oscillator
Ans: d

39. In a control system the output of the controller is given to
(a) final control element
(b) amplifier
(c) comparator
(d) sensor
(e) none of the above
Ans: a

40. A controller, essentially, is a
(a) sensor
(b) clipper
(c) comparator
(d) amplifier
Ans: c

41. Which of the following is the input to a controller ?
(a) Servo signal
(b) Desired variable value
(c) Error signal
(d) Sensed signal
Ans:

42. The on-off controller is a_____system.
(a) digital
(b) linear
(c) non-linear
(d) discontinuous
Ans:

43. The capacitance, in force-current analogy, is analogous to
(a) momentum
(b) velocity
(c) displacement
(d) mass
Ans: d

44. The temperature, under thermal and electrical system analogy, is considered analogous to
(a) voltage
(b) current
(c) capacitance

(d) charge
(e) none of the above
Ans: a

45. In electrical-pneumatic system analogy the current is considered analogous to
(a) velocity
(b) pressure
(c) air flow
(d) air flow rate
Ans: d

46. In liquid level and electrical system analogy, voltage is considered analogous to
(a) head
(b) liquid flow
(c) liquid flow rate
(d) none of the above
Ans: a

47. The viscous friction co-efficient, in force-voltage analogy, is analogous to
(a) charge
(b) resistance
(c) reciprocal of inductance
(d) reciprocal of conductance
(e) none of the above
Ans: b

48. In force-voltage analogy, velocity is analogous to
(a) current
(b) charge
(c) inductance
(d) capacitance
Ans: a

49. In thermal-electrical analogy charge is considered analogous to
(a) heat flow
(b) reciprocal of heat flow
(c) reciprocal of temperature
(d) temperature
(e) none of the above
Ans: d

50. Mass, in force-voltage analogy, is analogous to
(a) charge
(b) current
(c) inductance
(d) resistance

Ans: c

51. The transient response of a system is mainly due to
(a) inertia forces
(b) internal forces
(c) stored energy
(d) friction
Ans: c

52 signal will become zero when the feedback signal and reference signs are equal.
(a) Input
(b) Actuating
(c) Feedback
(d) Reference
Ans: b

53. A signal other than the reference input that tends to affect the value of controlled variable is known as
(a) disturbance
(b) command
(c) control element
(d) reference input
Ans: a

54. The transfer function is applicable to which of the following ?
(a) Linear and time-in variant systems
(b) Linear and time-variant systems
(c) Linear systems
(d) Non-linear systems
(e) None of the above
Ans: a

55. From which of the following transfer function can be obtained ?
(a) Signal flow graph
(b) Analogous table
(c) Output-input ratio
(d) Standard block system
(e) None of the above
Ans: a

56 is the reference input minus the primary feedback.
(a) Manipulated variable
(b) Zero sequence
(c) Actuating signal
(d) Primary feedback
Ans: c

57. The term backlash is associated with
(a) servomotors
(b) induction relays
(c) gear trains
(d) any of the above
Ans:

58. With feedback_____ increases.
(a) system stability
(b) sensitivity
(c) gain
(d) effects of disturbing signals
Ans: a

59. By which of the following the system response can be tested better ?
(a) Ramp input signal
(b) Sinusoidal input signal
(c) Unit impulse input signal
(d) Exponentially decaying signal
Ans: c

60. In a system zero initial condition means that
(a) The system is at rest and no energy is stored in any of its components
(b) The system is working with zero stored energy
(c) The system is working with zero reference signal
Ans: a

61. In a system low friction co-efficient facilitates
(a) reduced velocity lag error
(b) increased velocity lag error
(c) increased speed of response
(d) reduced time constant of the system
Ans: a

62. Hydraulic torque transmission system is analog of
(a) amplidyne set
(b) resistance-capacitance parallel circuit
(c) motor-generator set
(d) any of the above
Ans:

63. Spring constant in force-voltage analogy is analogous to
(a) capacitance
(b) reciprocal of capacitance
(c) current

(d) resistance
Ans: b

64. The frequency and time domain are related through which of the following?
(a) Laplace Transform and Fourier Integral
(b) Laplace Transform
(c) Fourier Integral
(d) Either (b) or (c)
Ans: a

65. An increase in gain, in most systems, leads to
(a) smaller damping ratio
(b) larger damping ratio
(c) constant damping ratio
(d) none of the above
Ans: a

66. Static error co-efficients are used as a measure of the effectiveness of closed loop systems for specified _____input signal.
(a) acceleration
(b) velocity
(c) position
(d) all of the above
Ans: d

67. A conditionally stable system exhibits poor stability at
(a) low frequencies
(b) reduced values of open loop gain
(c) increased values of open loop gain
(d) none of the above
Ans: b

68. The type 0 system has_____at the origin.
(a) no pole
(b) net pole
(c) simple pole
(d) two poles
(e) none of the above
Ans: a

69. The type 1 system has_____at the origin.
(a) no pole
(b) net pole
(c) simple pole
(d) two poles
Ans: c

70. The type 2 system has at the origin.
(a) no net pole
(b) net pole
(c) simple pole
(d) two poles
Ans: d

71. The position and velocity errors of a type-2 system are
(a) constant, constant
(b) constant, infinity
(c) zero, constant
(d) zero, zero
Ans: c

72. Velocity error constant of a system is measured when the input to the system is unit _____function.
(a) parabolic
(b) ramp
(c) impulse
(d) step
Ans: b

73. In case of type-1 system steady state acceleration is
(a) unity
(b) infinity
(c) zero
(d) 10
Ans: b

74. If a step function is applied to the input of a system and the output remains below a certain level for all the time, the system is
(a) not necessarily stable
(b) stable
(c) unstable
(d) always unstable
(e) any of the above
Ans: a

75. Which of the following is the best method for determining the stability and transient response ?
(a) Root locus
(b) Bode plot
(c) Nyquist plot
(d) None of the above
Ans: a

76. Phase margin of a system is used to specify which of the following ?
(a) Frequency response
(b) Absolute stability
(c) Relative stability
(d) Time response
Ans: c

77. Addition of zeros in transfer function causes which of the following ?
(a) Lead-compensation
(b) Lag-compensation
(c) Lead-lag compensation
(d) None of the above
Ans: b

78. technique is not applicable to nonlinear system ?
(a) Nyquist Criterion
(b) Quasi linearization
(c) Functional analysis
(d) Phase-plane representation
Ans: a

79. In order to increase the damping of a badly underdamped system which of following compensators may be used ?
(a) Phase-lead
(b) Phase-lag
(c) Both (a) and (b)
(d) Either (a) and (b)
(e) None of the above
Ans: a

80. The phase lag produced by transportation relays
(a) is independent of frequency
(b) is inverseh'proportional to frequency
(c) increases linearly with frequency
(d) decreases linearly with frequency
Ans: c

81. In a stable control system saturation can cause which of the following ?
(a) Low-level oscillations
(b) High-level oscillations
(c) Conditional stability
(d) Overdamping
Ans: a

82. Which of the following can be measured by the use of a tacho-generator ?

(a) Acceleration
(b) Speed
(c) Speed and acceleration
(d) Displacement
(e) None of the above
Ans: b

83 is not a final control element.
(a) Control valve
(b) Potentiometer
(c) Electro-pneumatic converter
(d) Servomotor
Ans: b

84. Which of the following is the definition of proportional band of a controller ?
(a) The range of air output as measured variable varies from maximum to minimum
(b) The range of measured variables from set value
(c) The range of measured variables through which the air output chan¬ges from maximum to minimum
(d) Any of the above
(e) None of the above
Ans: c

85. In pneumatic control systems the control valve used as final control element converts
(a) pressure signal to electric signal
(b) pressure signal to position change
(c) electric signal to pressure signal
(d) position change to pressure signal
(e) none of the above
Ans: b

86. Pressure error can be measured by which of the following ?
(a) Differential bellows and straingauge
(b) Selsyn
(c) Strain gauge
(d) Strain gauge and potentiometer
Ans: a

87. Which of the following devices is used for conversion of co-ordinates ?
(a) Microsyn
(b) Selsyn
(c) Synchro-resolver
(d) Synchro-transformer
Ans: c

88. The effect of error damping is to
(a) provide larger settling lime
(b) delay the response
(c) reduce steady state error
(d) any of the above
(e) none of the above
Ans: c

89 technique gives quick transient and stability response
(a) Root locus
(b) Bode
(c) Nyquist
(d) Nichols
Ans: a

90. A phase lag lead network introduces in the output
(a) lag at all frequencies
(b) lag at high frequencies and lead at low frequencies
(c) lag at low frequencies and lead at high frequencies
(d) none of the above
Ans: c

91. Which of the following is the non-linearity caused by servomotor ?
(a) Static friction
(b) Backlash
(c) Saturation
(d) None of the above
Ans: c

92 can be extended to systems which are time-varying ?
(a) Bode-Nyquist stability methods
(b) Transfer functions
(c) Root locus design
(d) State model representatives
Ans: d

93. When the initial conditions of a system are specified to be zero it implies that the system is
(a) at rest without any energy stored in it
(b) working normally with reference input
(c) working normally with zero reference input
(d) at rest but stores energy
Ans: d

94. Which of the following is an electromechanical device ?
(a) Induction relay

(b) Thermocouple
(c) LVDT
(d) Any of the above
(e) None of the above
Ans: c

95. A differentiator is usually not a part of a control system because it
(a) reduces damping
(b) reduces the gain margin
(c) increases input noise
(d) increases error
Ans: c

96. If the gain of the critical damped system is increased it will behave as
(a) oscillatory
(b) critically damped
(c) overdamped
(d) underdamped
(e) none of the above
Ans: d

97. In a control system integral error compensation _____ steady state error
(a) increases
(b) minimizes
(c) does not have any effect on
(d) any of the above
Ans: b

98. With feed back_____reduces.
(a) system stability
(6) system gain
(c) system stability and gain
(d) none of the above
Ans: b

99. An amplidyne can give which of the following characteristics ?
(a) Constant current
(b) Constant voltage
(c) Constant current as well as constant voltage
(d) Constant current, constant voltage and constant power
(e) None of the above
Ans: d

100. Which of the following can be measured byLVDT?
(a) Displacement
(b) Velocity

(c) Acceleration
(d) Any of the above
Ans: d

101 directly converts temperature into voltage.
(a) Thermocouple
(b) Potentiometer
(c) Gear train
(d) LVDT
(e) None of the above
Ans: a

102. The transfer function technique is considered as inadequate under which of the following conditions ? (a) Systems having complexities and non-linearities
(b) Systems having stability problems
(c) Systems having multiple input dis¬turbances
(d) All of the above
Ans: d

103. Which of the following is the output of a thermocouple ?
(a) Alternating current
(b) Direct current
(c) A.C. voltage
(d) D.C. voltage
(e) None of the above
Ans: d

104. A.C. servomotor is basically a
(a) universal motor
(b) single phase induction motor
(c) two phase induction motor
(d) three phase induction motor
Ans: c

105. The first order control system, which is well designed, has a
(a) small bandwidth
(b) negative time constant
(c) large negative transfer function pole
(d) none of the above
Ans: c

106. Which of the following is exhibited by Root locus diagrams ?
(a) The poles of the transfer function for a set of parameter values
(b) The bandwidth of the system
(c) The response of a system to a step input
(d) The frequency response of a system

(e) None of the above
Ans: a