KEC-101T KEC-201T	**EMERGING DOMAIN IN ELECTRONICS ENGINEERING**	**3L:0T:0P**	**3 Credits**

Important MCQ with solutions
Unit I
Semiconductor Diode, Diode Applications, Special Purpose two terminal Devices

1. The resistivity of semiconductor................. conductors and insulators.
   (a) is more than that of   (b) lies between that of
   (c) is less than that of   (d) none of the above
2. A semiconductor is formed by.....................bonds.
   (a) covalent   (b) electrovalent
   (c) co-ordinate   (d) none of the above
3. The most commonly used semiconductor is...........................
   (a) germanium   (b) carbon
   (c) sulphur   (d) silicon
4. In a semiconductor, the energy gap between valence band and conduction band is about........
   (a) 5 eV   (b) 10 eV
   (c) 15 eV   (d) 1 eV
5. A semiconductor has ....temperature co-efficient of resistance.
   (a) negative   (b) positive
   (c) zero   (d) none of the above
6. A semiconductor generally has ....valence electrons.
   (a) 2   (b) 3
   (c) 4   (d) 6
7. A crystal diode has............................
   (a) two *pn* junctions   (b) one *pn* junction
   (c) three *pn* junctions   (d) none of the above

8. A crystal diode has forward resistance of the order of............................
   (a) Ω   (b) kΩ
   (c) MΩ   (d) none of the above
9. When a pure semiconductor is heated, its resistance.................... .
   (a) goes down   (b) goes up

(c) remains the same (d) none of the above

10. The reverse current in a diode is of the order of.........................

(a) μA (b) mA

(c) A (d) kA

11. When a pentavalent impurity is added to a pure semiconductor, it becomes.................. semi-conductor.

(a) intrinsic (b) n-type

(c) p-type (d) none of the above

12. Addition of pentavalent impurity to a semiconductor creates many.......................... .

(a) free electrons (b) holes

(c) valence electrons (d) bound electrons

13. A pentavalent impurity has.......................

(a) 3 valence electrons (b) 6 valence electrons

(c) 4 valence electrons (d) 5 valence electrons

14. An n-type semiconductor is..........................

(a) positively charged (b) electrically neutral

(c) negatively charged (d) none of the above

15. A trivalent impurity has.......................... .

(a) 3 valence electrons (b) 5 valence electrons

(c) 6 valence electrons (d) 4 valence electrons

16. Addition of trivalent impurity to a pure semiconductor creates many..................

(a) free electrons (b) valence electrons

(c) holes (d) bound electrons

17. The forward voltage drop across a silicon diode is about............................

(a) 2.5 V (b) 3 V

(c) 0.7 V (d) 10 V

18. A pentavalent impurity is called....................... .

(a) donor impurity (b) acceptor impurity

(c) ionic impurity (d) none of the above

19.The charge of a hole is ....

(a) zero (b) equal to that of a proton

(c) equal to that of an electron (d) equal to that of a neutron

20. As a general rule, holes are found only in......................

(a) metals (b) semiconductors

(c) insulators (d) resistance materials

21. A semiconductor has a....................

(a) negative temperature co-eff. of resistance (b) positive temperature co-eff. of resistance

(c) constant temperature co-eff. of resistance (d) none of these

22. To obtain n-type semiconductor, the impurity added to pure semiconductor is..........

(a) trivalent (b) tetravalent

(c) pentavalent (d) none of these

23. To obtain p-type semiconductor, the impurity added to pure semiconductor is..........

(a) trivalent (b) tetravalent

(c) pentavalent (d) none of these

24. An n-type semiconductor has electrons as majority carriers, due to this, material attains negative charge on it.

(a) true (b) false

25. A p-type and n-type semiconductor attains positive and negative charge respectively.

(a) true (b) false

26. In a p-type semiconductor, the majority carriers are................

(a) holes (b) electrons

(c) positive ions (d) negative ions

27. When a p-n junction is prepared, a layer is formed around the junction called depletion layer because.....................

(a) p-type semiconductor has holes as majority carriers

(b) n-type semiconductor has electrons as majority carriers

(c) the charge carriers are depleted in this region

(d) all of these

28. For a germanium p-n junction, the maximum value of barrier potential is

(a) 0.3 V (b) 0.7 V

(c) 1.3 V (d) 1.3 V

29. When a p-n junction is forward-biased,

(a) it offers a low resistance, and a large current flows through it

(b) if offers a high resistance, and a small current flows through it

(c) it acts as an insulator and no current flows through it.

(d) the width of depletion layer increases.

30. When a p-n junction is reverse-biased.

(a) the width of depletion layer increases

(b) it offers a high resistance

(c) a small current flows through it because of minority carriers

(d) all of these

31. If the arrow of a crystal diode symbol is positive w.r.t. bar, then diode is .... biased.

(a) reverse (b) forward

(c) none of the two (d) forward or reverse

32. A crystal diode is used as........................

(a) an amplifier (b) a rectifier

(c) an oscillator (d) a voltage regulator

33. The *dc* resistance of a crystal diode is .... that of its *ac* resistance.

(a) the same as (b) more than

(c) less than (d) none of the above

34. An ideal crystal diode is one which behaves as a perfect ....when forward-biased.

(a) conductor (b) insulator

(c) resistance material (d) none of the above

35. The reverse resistance and forward resistance of crystal diode have a ratio of about................

(a) 1:1 (b) 1000:1

(c) 100:1 (d) 2:1

36. The leakage current in a crystal diode is due to..........................

(a) minority carriers (b) majority carriers

(c) junction capacitance (d) none of the above

37. If temperature of a crystal diode increases, leakage current........................

(a) remains the same (b) decreases

(c) increases (d) becomes zero

38. The *PIV* rating of a crystal diode is...................its breakdown voltage.

(a) lower than (b) more than

(c) the same as (d) none of the above

39. If the doping level of a crystal diode is increased, the breakdown voltage..............

(a) remains the same (b) is decreased

(c) is increased (d) none of the above

40. If doping level in a crystal diode is increased, the width of depletion layer.......................

(a) remains the same (b) is increased

(c) is decreased (d) none of above

41. A zener diode has....................

(a) one p-n junction (b) two p-n junctions

(c) three p-n junctions (d) none of the above

42.A zener diode is used as..........................

(a) an amplifier (b) a rectifier

(c) a voltage regulator (d) a multivibrator

43. The doping level in a zener diode is .... that of a crystal diode.

(a) more than (b) less than

(c) the same as (d) none of the above

44. Potential barrier at a p-n junction is established due to the charges on either side of the junction. These charges are........

(a) majority carriers (b) minority carriers

(c) both a and b (d) donor and acceptor ions

45. In a p-n junction, holes diffuse from the p-region to n-region because

(a) they move across the junction by the potential difference

(b) free electrons available in the n-region attract them

(c) the holes concentration in the p-region is greater as compared to n-region

(d) all of these

46. In a crystal diode, the barrier potential offers opposition to only

(a) free electrons in *n*-region (b) holes in *p*-region

(c) majority carriers in both regions (d) minority carriers in both regions.

47. When a reverse-bias is applied to a crystal diode, it

(a) raises the potential barrier (b) lowers the potential barrier

(c) increases the majority-carrier current greatly (d) none of these

48. When a p-n junction is forward-biased

(a) electrons in the *n*-region are injected into the *p*-region.

(b) holes in the *p*-region are injected into the *n*-region.

(c) both a and b (d) none of these

49. When a forward-bias is applied to a crystal diode, it

(a) raises the potential barrier (b) lowers the potential barrier

(c) reduces the majority-carrier current to zero (d) none of these

50. Avalanche breakdown in a crystal diode occurs when

(a) the potential barrier is reduced to zero (b) forward current exceeds a certain value

(c) reverse-bias exceeds a certain value (d)all of these

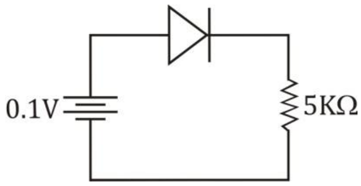
------------------------------Answers -----------------------------------

Multiple Choice Questions

1.(b)	2. (a)	3. (d)	4. (d)	5.(a)	6. (c)	7. (b)	8.(a)	9(a)	10. (a)
11.(b)	12. (a)	13. (d)	14. (b)	15.(a)	16.(c)	17.(c)	18.(a)	19(b)	20. (b)
21.(a)	22. (c)	23. (a)	24. (b)	25.(b)	26.(a)	27.(c)	28.(a)	29(a)	30. (d)
31.(b)	32. (b)	33. (c)	34. (a)	35.(b)	36.(a)	37.(c)	38.(a)	39(b)	40. (c)
41.(a)	42. (c)	43. (a)	44. (d)	45.(c)	46.(c)	47.(a)	48.(c)	49(b)	50. (c)

Multiple Choice Questions Diode Applications

1. The voltage across the resistor is



(a) 0.4V (b) 0V

(c) 0.2V (d) 0.42V

2. When a diode is used as a rectifier, the most important consideration is

(b) doping level (b) PIV

(d) forward resistance (d) none of the above

3. In a full-wave rectifier without filter, the ripple factor is

(a) 0.482 (b) 1.21

(c) 1.79 (d) 2.05

4. The value of ripple factor of a half-wave rectifier without filter is approximately

(a) 1.21 (b) 0.21

(c) 2.22 (d) 2.01

5. The transformer utilization factor of a half-wave rectifier is approximately

(a) 0.60 (b) 0.29

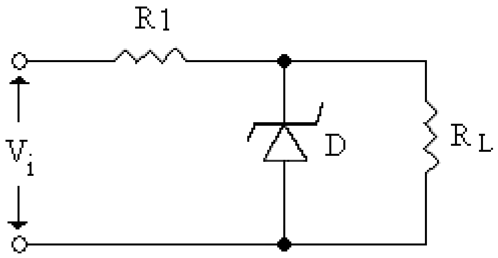
(c) 0.89 (d) 1.11

6. If the output voltage of a bridge rectifier is 100V, the PIV of diode will be

(a) $100\sqrt{2}\,V$ (b) $100/\pi\,V$

(c) $100\pi\,V$ (d) $100\pi/2\,V$

7. In the voltage regulator shown below, if the current through the load decreases,



(a) the current through R1 will increase.

(b) the current through R1 will decrease.

(c) Zener diode current will increase.

(d) Zener diode current will decrease

8. Rectification efficiency of a full-wave rectifier without filter is nearly equal to

(a) 40.6% (b) 61.3%

(c) 100% (d) 81.2%

9. Rectification efficiency of a half-wave rectifier without filter is nearly equal to

(a) 100% (b) 80.8%

(c) 50.5% (d) 40.6%

10. In a clamping circuit, the peak-to peak voltage of the waveform being clamped is

(a) affected by the clamping

(b) not affected by the clamping

(c) determined by the clamping voltage value

(d) determined by the ratio of rms voltage of the waveform and the clamping voltage

11. In a half-wave rectifier, the load current flows

(a) only for the positive half-cycle of the input signal

(b) for less than half-cycle of the input signal

(c) for more than half-cycle of the input signal

(d) for whole cycle of the input signal

12. In a full-wave rectifier, the current in each diode flows for

(a) whole cycle of the input signal (b) half-cycle of the input signal

(c) more than half-cycle of the input signal (d) none of these

13. In full-wave rectification, if the input frequency is 50 Hz, then the output frequency will be

(a) 50 *Hz* (b) 75 *Hz*

(c) 100 *Hz* (d) 200 *Hz*

14. In a centre-tapped full-wave rectifier, if V_m is the peak voltage between the centre-tap and one end of the secondary, the maximum voltage coming across the reverse-biased diode is

(a) V_m (b) $2\ V_m$

(c) $V_m /2$ (d) $V_m /\sqrt{2}$

15. In a bridge-type full-wave rectifier, if V_m is the peak voltage across the secondary of the transformer, the maximum voltage coming across each reverse-biased diode is

(a) V_m (b) $2\ V_m$

(c) $V_m /2$ (d) $V_m /\sqrt{2}$

16. If the peak value of the input voltage to a half-wave rectifier is 28.28 volts and no filter is used, the maximum dc voltage across the load will be

(a) 20.2V (b) 15 V

(c) 9 V (d) 14.14 V

17. The turns ratio of a transformer used in a half-wave rectifier is 10:1.The primary is connected to the power mains, 220 V, 50 Hz. If the diode resistance in forward-bias is zero ,the dc voltage across the load will be nearly

(a) 15 V (b) 10 V

(c) 12 V (d) 8 V

18. The turns ratio of a transformer used in a full-wave rectifier is 10:1.The primary is connected to the power mains, 220 V, 50 Hz. If the diode resistance in forward-bias is zero ,the dc voltage across the load will be nearly

(a) 60 V (b) 40 V

(c) 20 V (d) 50 V

19. Zener diodes are used in regulator networks to

(a) generate voltage (b) consume power

(c) maintain a fixed voltage across the load resistor (d) none of these

20. A silicon diode in a half-wave rectifier has a barrier potential of 0.7V. This has the effect of

(a) reducing the peak output voltage by 0.7V

(b) increasing the peak output voltage by 0.7V

(c) reducing the peak input voltage by 0.7V

(d) no effect

Answers

Multiple Choice Questions

1.(b)	2. (b)	3. (a)	4. (a)	5.(b)	6. (d)	7. (c)	8.(d)	9.(d)	10. (b)
11.(a)	12.(b)	13.(c)	14.(b)	15.(a)	16.(c)	17.(b)	18.(c)	19.(c)	20.(a)

Multiple Choice Questions Special Purpose Diode

1. A varactor diode is optimized for
   (a) high output voltage (b) high output current
   (c) its variable capacitance (d) its variable inductance
2. When the reverse-bias potential is increased across a varactor diode,
   (a) width of depletion layer increases which increases the capacitance.
   (b) width of depletion layer increases which decreases the capacitance.
   (c) width of depletion layer decreases which decreases the capacitance.
   (d) width of depletion layer decreases which increases the capacitance.
3. The light-emitting diode (LED)
   (a) is usually made from metal oxide.
   (b) is used in reverse-biased junction.
   (c) gives a light output which increases with temperature.
   (d) emits light due to recombination of holes and electrons.
4. The material used for the construction of LED is
   (a) Si (b) Ge
   (c) GaAsP (d) None of these
5. The barrier potential of a Schottky diode is
   (a) 0.25 V (b) 0.7 V
   (c) 0.3 V (d) 1.7V
6. Tunnel diode
   (a) is mainly operated with reverse-bias.
   (b) has a negative resistance region with reverse-bias.
   (c) has very high impurity concentration thus increasing the barrier width.
   (d) electrons have a finite probability of penetrating the potential barrier.

7. As the temperature across LED increases
   (a) the intensity of light emitted decreases.
   (b) the intensity of light emitted increases.
   (c) there is no change in the intensity of light emitted.
   (d) it simply switches-off.
8. Which one of the following statements is correct with respect to LCDs?
   (a) They do not generate their own light.
   (b) They are high power consuming display devices.
   (c) They are costly.
   (d) They are very fast responding devices.
9. Tunnel diode is a
   (a) linear resistor. (b) current dependent resistor.
   (b) voltage dependent resistor. (d) non-linear resistor.
10. In a forward-biased photodiode, with increase in incident light intensity the diode current
   (a) increases. (b) remains constant.
   (c) decreases. (d) remains constant, the voltage drop across the diode increases.
11. The power consumption of LEDs may be of the order of
   (a) 5 to 10 nanowatt. (b) 5 to 10 microwatt.
   (c) 5 to 10 milliwatt. (d) 5 to 10 watt.
12. With reference to the reverse-biased p-n junction photodiode, the following statements are made.
   (1) The number of electron hole pairs due to illumination is proportional to the number of incident photons.
   (2) While the photon current is essentially due to minority carriers, the saturation current is due to majority carrier flow.
   (3) The photon current and the saturation current are in the same direction.
   (4) The effect of illumination can be considered as a majority carrier injection.

Of the four statements, the true statements are
   (a) All four (b) (1) and (2)
   (c) (2) and (3) (d) (1) and (3)
13. In LED, light is emitted because
   (a) recombination of charge takes place. (b) we make the light fall on LED.

(c) diode emits light when heated. (d) none of these.

14. With reference to semiconductor photodiode, the following statements are made
    (1) In a typical volt-ampere characteristics for a given illumination, the reverse current is almost constant for increasing reverse voltages.
    (2) The photo current is due to drifting of injected carriers.
    (3) The radiation can be considered as a minority carrier injector.
    (4) Due to creation of electron hole pairs by incident photons, the percentage concentration of majority carriers is much greater than the percentage increase in minority carriers.

The correct statements are

(a) (2) & (4) (b) (1) & (2)

(c) (2) & (3) (d) (1) & (3)

15. The switching speed of a p-n junction (having a heavily doped p region) depends primarily on
    (a) mobility of minority carriers in the p+ region.
    (b) the life time of minority carriers in the p+ region.
    (c) the mobility of majority carriers in the n region.
    (d) the life time of minority carriers in the n region.
16. In switching a junction diode from forward to reverse voltage bias, the recovery of the current to the saturation value is delayed.
    (a) During this time the excess minority carriers have to drop to zero.
    (b) During this time the current is in the same direction as the forward current.
    (c) During this time the excess minority carriers have disappeared and the minority carrier density reaches zero value at the junction.
    (d) During this time the voltage across the diode is in the direction of forward-bias.
17. LEDs do not require
    (a) heating. (b) warm up time.
    (b) Both (a) and (b) above. (d) None of the above.
18. Which of the following material is used for infrared LEDs?
    (a) Gallium arsenide (b) Calcium phosphide
    (c) Silicon (d) None of the above
19. Which diode is otherwise called as hot carrier diode?
    (c) Tunnel diode (b) Schottky diode
    (d) Varactor diode (d) Photo diode

20. Tunnel diode is basically a junction diode with
    (a) High doping in p region alone.
    (b) High doping in p region alone.
    (c) High doping in both p and n regions.
    (d) Low doping in both p and n regions.

Answers

Multiple Choice Questions

1.(c)	2. (b)	3. (d)	4. (c)	5.(a)	6. (d)	7. (a)	8. (a)	9. (c)	10. (c)
11.(c)	12. (d)	13. (a)	14. (d)	15. (d)	16.(c)	17.(c)	18. (a)	19. (b)	20. (c)

Extra Related MCQ

1. A pure semiconductor is often referred to as
A) extrinsic semiconductor
B) intrinsic semiconductor
C) doped semiconductor
D) none of the above

2. In a p-type semiconductor, the majority current Carriers are
A) free electrons
B) valence electrons
C) holes
D) protons

3. A diode is a
A) nonlinear device
B) linear device
C)unidirectional device
D)both a and c

4. A p-type semiconductor is a semiconductor doped with
A) trivalent impurity
B) pentavalent impurity atoms
C)impurity atoms whose electron valence is + 4
D)none of the above

5. What is the DC output voltage of an unfiltered half wave rectifier whose peak output voltage is 9.8 volt
A) 6.23 volt

B) 19.6 volt
C) 9.8 volt
D) 3.1 volt
(Hint : Vdc =0.318 * Vo/p(pk))

6. In n-type semiconductor the minority current carriers are
A) free electrons
B) protons
C) valence electrons
D) the holes

7. To a first approximation a forward biased diode is treated like a
A) open switch with infinite resistance
B) closed switch with the voltage drop of zero volt
C) close switch in series with the battery voltage of 0.7 volt
D) lose switch in series with a small resistance and a battery

8. What is the frequency of the capacitor ripple voltage in a full wave rectifier circuit if the frequency of the transformer secondary voltage is 60 Hertz
A) 60 Hertz
B)120 Hertz (Hint : F(out)=2 F(in))
C) 50 Hertz
D) be this is impossible to determine

9. In a full wave rectifier the DC load current equals 1 ampere, how much DC current is carried by each diode
A) 1/2 A
(Hint: I(diode)=I(load)/2)
B)1ampere
B) 1 ampere
C)2 ampere
D)0 Ampere

10. An n-type semiconductor is a semiconductor that has been doped with
A) trivalent impurity atoms
B) pentavalent impurity atom
C) impurity atoms whose electrons valence is + 4
D) none

11. For a silicon diode the barrier potential Vb is approximately equal to
A) 0.3 volt
B) 0.7 volt
C) 6.8 volt
D) 2.0 volt

12. To forward biased diode
A) the cathode voltage must be positive with respect to the anode
B) the anode voltage must be positive with respect to its cathode
C) the anode voltage must be negative with respect to its cathode
D) none of the above

13. **The sharing of valence electron in a silicon crystal is called**
A) doping
B) coupling
C) covalent bonding
D) the avalanche effects

14. Reverse bias diode acts like
A) open switch
B) close switch
C) small resistance
D) none of the above

15. When used as a voltage regulator, zener diode is normally
A) not baised
B) forward biased
C) reverse biased
D) none of the above

16. For a germanium diode, the barrier potential is
A) 0.3 volt
B) 0.3 eV
C) 0.7 volt
D) 0.7 eV

17. In a loaded Zener regulator , the series resistor has a current of 120 mA , if the load current is 45 mA .How much is the Zener current ?
A) 75 mA (Hint : Iz =Is – I(load))
B) 45 mA
C) 165 mA
D) this is impossible to determine

18. The approximate voltage drop across a forward biased LED is
A) 0.3 volt
B)2.0 volt
C) 5.6 volt
D) 0.7 volt

19. The output from an unfiltered half wave or full wave rectifier is a
A) smooth DC voltage
B) steady DC voltage
C) pulsating DC voltage
D) AC voltage

20. A 12 volt Zener diode has a 1 watt power rating , what is the maximum rated Zener current ?
A) 1 ampere
B) 46.1 milliampere
C) 83.3 milliampere
(Hint: I=P/V)

D) 120 milliampere

21. If the arrow of the Crystal diode symbol is positive with respect to bar, then the diode is ….
A) forward
B) reverse
C) either forward or reverse
D) none of the above.

22. In the breakdown region ,a zener diode behaves like a …. source
A) constant voltage
B) constant current
C) constant resistance
D) none of the above

23. If the temperature of Crystal diode increases ,the leakage current…
A) remains the same
B) decreases
C) increases
D) become zero

24. When the crystal current diode is large, the bias is
A) forward
B) inverse
C) poor
D) reverse

25. for the same secondary voltage , output voltage from a centre tap rectifiers….. than that of bridge rectifier.
A) twice
B) thrice
C) one half
D) four times

26. Zener diode is used as
A) an amplifier
B) a voltage regulator
C) a multivibrator
D) a rectifier

27. The disadvantage of a half wave rectifier is that the
A) components are expensive
B) diodes must have a higher power rating
C) output is difficult to filter
D) none of the above

28. A zener diode has … breakdown voltage
A) undefined
B) zero
C) sharp

D) none of the above

29. Zener diode is always… connected
A) reverse
B) either reverse or forward
C) forward
D) none of the above

30. A 10 volt power supply would use as ……filter capacitor
A) electrolytic capacitor
B) mica capacitor
C) paper capacitor
D) air capacitor

31. The…. filter circuit results in the best voltage regulation
A) choke input
B) capacitor input
C) resistance input
D) none of the above

32. If the PIV rating of a diode is exceeded,…..
A) the diode conducts poorly
B) the diode is destroyed
C) the diode behaves like a zener diode
D) none of the above

33. Zener diode is destroyed if it…
A) is forward biased
B) is reverse biased
C)carries more than the rated current
D) none of the above

34. If the doping level of a crystal diode is increased ,the breakdown voltage
A) remains the same
B) is increased
C) is decreased
D) none of the above

35. Mains AC power is converted into DC power for
A) lightning purpose
B) heaters
C) using in electronics equipment
D) none of the above

36. The ripple factor of a half wave rectifier is…
A) 2
B) 1.21
C) 2.5
D) 0.48

37. The maximum efficiency of a half wave rectifier is…….
A) 40.6%
B) 81.2%
C) 50%
D) 25%

38. The most widely used rectifier is
A) half wave rectifier
B) centre-tap full wave rectifier
C) bridge full-wave rectifier
D) none of the above

39. Zener diode has…
A)1 PN junction
B) 2 PN junction
C) 3 PN junction
D) 4 PN junction

40. Avalanche breakdown in a crystal diode occurs when
A) the potential barrier is reduced to zero
B) forward current exceeds a certain value
C) reverse bias exceeds a certain value
D) none of the above

41. When crystal diode is used as a rectifier, the most important consideration is….
A) forward characteristic
B) doping level
C) reverse characteristic
D) PIV rating

42. When the graph between current through and voltage across a device is a straight line, the device is referred to a
A) linear
B) active
C) nonlinear
D) passive

43. The leakage current in a crystal diode is due to
A) minority charge carriers
B) majority charge carriers
C) junction capacitance
D) none of the above

44. The PIV rating of a crystal diode is…. …..that of equivalent vacuum diode
A) same as
B) lower than
C) more than
D) none of the above

45. The knee voltage of a crystal diode is approximately equal to..

A) barrier potential
B) breakdown voltage
C) applied voltage
D) forward voltage

46.If the doping level in a crystal diode is increased , the width of depletion layer
A) remains the same
B) is increased
C) is decreased
D) none of the above

47. The doping level in a zener diode is …………………………… that of a crystal diode
A) same as
B) more than
C) less than
D) none of the above

48. A series resistance is connected in the zener circuit to…
A) protect the zener diode
B) properly reverse bias the zener
C) properly forward bias the zener
D) none of the above

49. zener diode is a …. device
A) non-linear
B) linear
C) amplifying
D) none of the above

50. In a half wave rectifier, the load current flows for
A) the complete cycle of input signal
B) only for positive half cycle of the input signal
C) less than half cycle of the input signal
D) more than half cycle but less than the complete cycle of input signal

MCQ special purpose diode Zener LED

51. A Zener diode has a
a) high forward voltage rating
b) negative resistance
c) high amplification
d) **sharp breakdown voltage at lower reverse voltage**

52. A Zener diode is used as
a) an amplifier
b) **a voltage regulator**
c) a coupler
d) a rectifier

53. A Zener diode is operated in

a) **breakdown region**
b) forward characteristic region
c) both a and b
d) none of these

54. The output voltage of a Zener diode rated as 12 volt +/- 10% tolerance is
a) 12.2 to 11.8 volt
b) **13.2 to 10.8 volt**
c) only 12 volt
d) none of these

Hint:(12+1.2=13.2 and 12-1.2=10.8)

55. A varactor diode is optimised for
a) high output voltage
b) high output current
c) **its variable capacitance**
d) its variable inductance

56. When the reverse bias potential is increased across a varactor diode
a) width of depletion layer increases which increases the capacitance
b) **width of depletion layer increases which decreases the capacitance**
c) width of depletion layer decreases which increases the capacitance
d) width of depletion layer decreases which decreases the capacitance
57. The light emitting diode (LED)
a) it usually made from metal oxide
b) used in reverse biased junction
c) gives a light output which increases with temperature
d) **emits light due to recombination of holes and electrons**

58. The material used for the construction of LED is
a) silicon
b) germanium
c) **gallium arsenide phosphide**
d) none of these

59. The barrier potential of Schottky diode is
a) **0.25 volt**
b) 0.7 volt
c) 0.3 volt
d) 1.7 volt

60. A diode which has zero breakdown voltage is known as
a) zener diode
b) backward diode
c) schottky diode
d) **tunnel diode**

61. The important applications of Zener diode are

a) metre protection
b) voltage stabilizer
c) wave shaping

d) **All of these**

62. What is true about the breakdown voltage in the Zener diode
a) it decreases when current increases
b) it destroys the diode
c) **it approximately constant**
d) it equals to the current times of the resistance

63. Which of these is the best description of Zener diode
a)it is the rectifier diode
b) **it is a constant voltage device**
c) it is a constant current device
d) it works in forward region

64. The voltage across the Zener resistance is usually
a) **small**
b) large
c) measured in volts
d) subtracted from the breakdown voltage

65. At high frequencies, ordinary diode doesn't work properly because of
a) forward biased
b) reverse biased
c) breakdown voltage
d) **charge storage**

UNIT II

Bipolar Junction Transistors and Field Effect Transistors

1. Transistor is a:
   (a) Current controlled current device (b) Current controlled voltage device
   (c) Voltage controlled current device (d) Voltage controlled voltage device
2. A transistor has............................
(a) one *p-n* junction (b) two *p-n* junctions
(c) three *p-n* junctions (d) four *p-n* junctions
3. The number of depletion layers in a transistor is................................
(a) three (b) two
(c) one (d) four
4. In an npn transistor, p region is called..........................
(a) collector (b) emitter
(c) base (d) none of the above
5. The element that has the biggest size in a transistor is...........................
(a) base (b) emitter
(c) collector (d) collector-base junction
6. The collector of a transistor is...............................doped.
(a) heavily (b) lightly
(c) moderately (d) none of the above
7. The arrowhead on the transistor symbol points in the director of
(a) electrons flow in the emitter region
(b) minority carriers flow in the emitter region
(c) majority carriers flow in the emitter region
(d) conventional current flow in the emitter region
8. The base of a transistor is........................... doped.
(a) lightly (b) moderately
(c) heavily (d) none of the above
9. The base current of a transistor is typically:
   (a) less than emitter current
   (b) greater than emitter current
   (c) same as emitter current
   (d) equal to the sum of emitter and collector currents

10. The emitter of a transistor is .... doped.

(a) lightly (b) heavily

(c) moderately (d) none of the above

11. The transistor must be operated in ______ when employed as an amplifying device:

(a) saturation region (b) cut-off region

(c) active region (d) any of the three

12. When both the junctions of a transistor are forward-biased, it is said to be in the:

(a) active region (b) passive region

(c) cut-off region (d) saturation region

13. In a correctly biased npn transistor:

(a) The base is positive with respect to collector

(b) The base is positive with respect to emitter

(c) The base is positive with respect to both emitter and collector

(d) None of these

14. Biasing represents .... conditions.

(a) *ac* (b) *dc*

(c) both *dc* and *ac* (d) none of the above

15. For faithful amplification, the value of V_{BE} should .... for silicon transistor.

(a) be zero (b) be 0.01 V

(c) not fall below 0.7V (d) be between 0V and 0.1 V

16. A transistor is said to be in a quiescent state when

(a) it is unbiased (b) no signal is applied to the output

(c) no signal is applied to the input (d) emitter junction is just biased equal to collector junction

17. The I_{CBO} is the current that flows when some dc voltage is applied

(a) in the forward direction to the emitter junction with collector open

(b) in the reverse direction to the emitter junction with collector open

(c) in the reverse direction to the collector junction with emitter open

(d) in the forward direction to the collector junction with emitter open

18. I_{CBO} in a transistor can be reduced by:

(a) reducing I_B (b) reducing V_{CC}

(c) reducing I_E (d) reducing the temperature

19. A junction transistor with $\beta = 49$ and $I_{CO} = I_{CBO} = 1\mu A$ has $I_B = 10\mu A$. The value of I_C is given in μA by:

(a) 441 (b) 490

(c) 539 (d) 540

20. In a transistor, if $I_C = 9.95mA$ and $I_E = 10mA$ then the value of β is given by:

(a) 199 (b) 99

(c) 9 (d) 1

21. The input resistance of a common-emitter transistor is of the order:

(a) 1 $M\Omega$ (b) 1 $K\Omega$

(c) 0.01Ω (d) 0.001Ω

22. Lowest output resistance is obtained in:

(a) CB (b) CE

(c) CC (d) None of these

23. The current gain of a transistor is:

(a) the ratio of collector current to emitter current

(b) the ratio of collector current to base current

(c) the ratio of base current to collector current

(d) the ratio of emitter current to collector current

24. The leakage current in CE configuration may be around:

(a) few nanoamperes (b) few microamperes

(c) few hundred microamperes (d) few milliamperes

25. If a transistor emitter current is 2 mA, the collector current is:

(a) greater than 2 mA (b) less than 2 mA

(c) equal to 2 mA (d) equal to 4 mA

26. In a pnp transistor in the active region of operation, the base current is due to:

(a) holes injected into the emitter from base

(b) holes entering the base from the terminal for recombination

(c) only saturation current due to reverse bias of collector junction

(d) electrons recombining with a part of the diffusing holes in the base region.

27. For transistor action

(a) the base region must be very thin and lightly doped

(b) the emitter junction should be forward biased and collector junction should be reverse biased

(c) the emitter should be heavily doped so that it can supply the required amount of majority carriers

(d) all of these

28. In CB configuration, the output V-I characteristics of a transistor are drawn by taking

(a) V_{CB} versus I_C for constant I_E (b) V_{CB} versus I_B for constant I_E

(c) V_{CE} versus I_C for constant I_E (d) V_{CE} versus I_B for constant I_E

29. In CE configuration, the input V-I characteristics are drawn by taking

(a) V_{CE} versus I_C for constant value of I_E (b) V_{BE} versus I_E for constant value of V_{CE}

(c) V_{BE} versus I_B for constant value of I_C (d) V_{BE} versus I_B for constant value of V_{CE}

30. The β of a transistor may be determined directly from the curve plotted between

(a) V_{CE} and I_C for constant I_B (b) V_{CE} and I_C for constant I_E

(c) V_{CE} and I_E for constant I_B (d) V_{BE} and I_E for constant V_{CE}

31. In CE mode of transistor, the most noticeable effect of a small increase in temperature is

(a) the increase in output resistance (b) the increase in leakage current I_{CEO}

(c) the decrease in ac current gain (d) the increase in ac current gain

32. The current I_{CEO} is

(a) The emitter current in the CC connected transistor with zero base current

(b) The collector current in the CE connected transistor with zero emitter current

(c) The collector current in the CE connected transistor with zero base current

(d) Same as I_{CBO}

33. In CE configuration, the output V-I characteristics are drawn by taking

(a) V_{CE} versus I_C for constant value of I_E (b) V_{CE} versus I_C for constant value of I_B

(c) V_{CE} versus I_E for constant value of V_{CB} (d) none of these

34. The emitter current in a junction with normal bias

(a) is almost equal to the base current

(b) is equal to the sum of I_B and I_C

(c) changes greatly by a small change in collector bias voltage

(d) is equal to I_{CBO}

35. In cut-off region:

(a) both emitter and collector junctions are forward-biased

(b) both emitter and collector junctions are reverse-biased

(c) emitter junction is forward-biased , collector junction is reverse-biased

(d) no biasing is required

36. Emitter bias depends on:

(a) Signal input (b) I_E

(c) Gain (d) I_C

37. Which of the following configurations is normally used in cascading?

(a) common-emitter (b) common-base

(c) common-collector (d) All of these

38. In a pnp transistor biased to operate in the active region, the current in the base region consists of:

(a) only holes (b) only electrons

(c) predominantly holes (d) predominantly electrons

39. In a BJT, $I_{CO} = I_{CBO} = 2\mu A$ given $\alpha = 0.99$, the value of I_{CEO} is:

(a) $2\mu A$ (b) $99\mu A$

(c) $198\mu A$ (d) $200\mu A$

40. I_{CBO} of a transistor can be decreased by decreasing:

(a) I_B (b) I_C

(c) I_E (d) none of these

41. Emitter current in a CE circuit:

(a) can be made zero as in a CB circuit

(b) can be made zero by reverse-biasing BE junction

(c) can be made zero by forward-biasing BE junction

(d) can be made zero by reverse-bias of 0.1 V for silicon and 0V for germanium transistor

42. A transistor, when connected in CE mode, has

(a) low input resistance and low output resistance

(b) high input resistance and high output resistance

(c) high input resistance and low output resistance

(d) medium input resistance and high output resistance

43. The CE amplifier circuits are preferred over CB amplifier circuits because they have

(a) lower amplification factor

(b) larger amplification factor

(c) high input resistance and low output resistance

(d) none of these

44. The silicon transistors are more widely used than germanium transistors because

(a) they have smaller leakage current

(b) they have better ability to dissipate heat

(c) they have smaller depletion layers

(d) they have larger current carrying capacity

45. The common collector transistor configuration has:

(a) high current gain and high input resistance

(b) high current gain and low input resistance

(c) low current gain and high input resistance

(d) low current gain and low input resistance

------------------------------**Answers**-----------------------------------

Multiple Choice Questions

1.(a)	2. (b)	3. (b)	4. (c)	5.(c)	6. (c)	7. (d)	8.(a)	9(a)	10. (b)
11.(c)	12. (d)	13. (b)	14. (b)	15.(c)	16.(c)	17.(c)	18.(d)	19(d)	20. (a)
21.(b)	22. (c)	23. (b)	24. (d)	25.(b)	26.(d)	27.(d)	28.(a)	29(d)	30. (a)
31.(b)	32. (c)	33. (b)	34. (b)	35.(b)	36.(b)	37.(a)	38.(c)	39(d)	40. (d)
41.(b)	42. (d)	43. (b)	44. (a)	45.(a)					

Multiple Choice Questions and Answers on Transistors

Practice Extra Questions on
Bipolar Junction Transistor

Q1. A transistor has …………………

1. one pn junction
2. two pn junctions
3. three pn junctions
4. four pn junctions

Answer : 2

Q2. The number of depletion layers in a transistor is …………

1. four
2. three

3. one
4. two

Answer : 4

Q3. The base of a transistor is ………….. doped

1. heavily
2. moderately
3. lightly
4. none of the above

Answer : 3

Q4. The element that has the biggest size in a transistor is ………………..

1. collector
2. base
3. emitter
4. collector-base-junction

Answer : 1

Q5. In a pnp transistor, the current carriers are …………

1. acceptor ions
2. donor ions
3. free electrons
4. holes

Answer : 4

Q6. The collector of a transistor is …………. doped

1. heavily
2. moderately
3. lightly
4. none of the above

Answer : 2

Q7. A transistor is a …………… operated device

1. current
2. voltage
3. both voltage and current
4. none of the above

Answer : 1

Q8. In a npn transistor, ……………. are the minority carriers

1. free electrons
2. holes
3. donor ions
4. acceptor ions

Answer : 2

Q9. The emitter of a transistor is ………………… doped

1. lightly
2. heavily
3. moderately

4. none of the above

Answer : 2

Q10. In a transistor, the base current is about ………….. of emitter current

1. 25%
2. 20%
3. 35 %
4. 5%

Answer : 4

Q11. At the base-emitter junctions of a transistor, one finds ……………

1. a reverse bias
2. a wide depletion layer
3. low resistance
4. none of the above

Answer : 3

Q12. The input impedance of a transistor is ………….

1. high
2. low
3. very high
4. almost zero

Answer : 2

Q13. Most of the majority carriers from the emitter ………………..

1. recombine in the base
2. recombine in the emitter
3. pass through the base region to the collector
4. none of the above

Answer :3

Q14. The current I_B is …………

1. electron current
2. hole current
3. donor ion current
4. acceptor ion current

Answer : 1

Q15. In a transistor ………………..

$I_C = I_E + I_B$

$I_B = I_C + I_E$

$I_E = I_C – I_B$

$I_E = I_C + I_B$

Answer : 4

Q16. The value of α of a transistor is ……….

- more than 1
- less than 1
- 1
- none of the above

Answer : 2

Q17. $I_C = \alpha I_E +$ …………..

1. I_B
2. I_{CEO}
3. I_{CBO}
4. βI_B

Answer : 3

Q18. The output impedance of a transistor is ……………..

1. high
2. zero
3. low
4. very low

Answer : 1

Q19. In a tansistor, I_C = 100 mA and I_E = 100.2 mA. The value of β is …………

1. 100
2. 50
3. about 1
4. 200

Answer : 4

Q20. In a transistor if β = 100 and collector current is 10 mA, then I_E is …………

1. 100 mA
2. 100.1 mA
3. 110 mA
4. none of the above

Answer : 2

Q21. The relation between β and α is …………..

1. $\beta = 1 / (1 - \alpha)$
2. $\beta = (1 - \alpha) / \alpha$
3. $\beta = \alpha / (1 - \alpha)$
4. $\beta = \alpha / (1 + \alpha)$

Answer : 3

Q22. The value of β for a transistor is generally ………………..

1. 1
2. less than 1
3. between 20 and 500
4. above 500

Answer : 3

Q23. The most commonly used transistor arrangement is …………… arrangement

1. common emitter
2. common base
3. common collector
4. none of the above

Answer : 1

Q24. The input impedance of a transistor connected in …………….. arrangement is the highest

1. common emitter
2. common collector
3. common base
4. none of the above

Answer : 2

Q25. The output impedance of a transistor connected in ……………. arrangement is the highest

1. common emitter
2. common collector
3. common base
4. none of the above

Answer : 3

Q26. The phase difference between the input and output voltages in a common base arrangement is …………….

1. 180^o
2. 90^o
3. 270^o
4. 0^o

Answer : 4

Q27. The power gain in a transistor connected in ……………. arrangement is the highest

1. common emitter
2. common base
3. common collector
4. none of the above

Answer : 1

Q28. The phase difference between the input and output voltages of a transistor connected in common emitter arrangement is ………………

1. 0^o
2. 180^o
3. 90^o
4. 270^o

Answer : 2

Q29. The voltage gain in a transistor connected in ………………. arrangement is the highest

1. common base
2. common collector
3. common emitter
4. none of the above

Answer : 3

Q30. As the temperature of a transistor goes up, the base-emitter resistance ……………

1. decreases
2. increases
3. remains the same
4. none of the above

Answer : 1

Q31. The voltage gain of a transistor connected in common collector arrangement is ………..

1. equal to 1
2. more than 10
3. more than 100
4. less than 1

Answer : 4

Q32. The phase difference between the input and output voltages of a transistor connected in common collector arrangement is ………………

1. 180^o
2. 0^o
3. 90^o
4. 270^o

Answer : 2

Q33. $I_C = \beta I_B$ + ………..

1. I_{CBO}
2. I_C
3. I_{CEO}
4. αI_E

Answer : 3

Q34. $I_C = [\alpha / (1 - \alpha)] I_B$ + …………

1. I_{CEO}
2. I_{CBO}
3. I_C
4. $(1 - \alpha) I_B$

Answer : 1

Q35. $I_C = [\alpha / (1 - \alpha)] I_B + [\ldots\ldots.. / (1 - \alpha)]$

1. I_{CBO}
2. I_{CEO}
3. I_C
4. I_E

Answer : 1

Q36. BC 147 transistor indicates that it is made of …………..

1. germanium
2. silicon
3. carbon
4. none of the above

Answer : 2

Q37. I_{CEO} = (………) I_{CBO}

1. β
2. 1 + α
3. 1 + β
4. none of the above

Answer : 3

Q38. A transistor is connected in CB mode. If it is not connected in CE mode with same bias voltages, the values of I_E, I_B and I_C will …………..

1. remain the same
2. increase
3. decrease
4. none of the above

Answer : 1

Q39. If the value of α is 0.9, then value of β is ………..

1. 9
2. 0.9
3. 900
4. 90

Answer : 4

Q40. In a transistor, signal is transferred from a …………… circuit

1. high resistance to low resistance
2. low resistance to high resistance
3. high resistance to high resistance
4. low resistance to low resistance

Answer : 2

Q41. The arrow in the symbol of a transistor indicates the direction of ………….

1. electron current in the emitter
2. electron current in the collector
3. hole current in the emitter
4. donor ion current

Answer : 3

Q42. The leakage current in CE arrangement is ……………. that in CB arrangement

1. more than
2. less than
3. the same as
4. none of the above

Answer : 1

Q43. A heat sink is generally used with a transistor to …………

1. increase the forward current
2. decrease the forward current
3. compensate for excessive doping
4. prevent excessive temperature rise

Answer : 4

Q44. The most commonly used semiconductor in the manufacture of a transistor is ………….

1. germanium
2. silicon
3. carbon
4. none of the above

Answer : 2

Q45. The collector-base junction in a transistor has ……………..

1. forward bias at all times
2. reverse bias at all times
3. low resistance
4. none of the above

Answer : 2

Q46. When transistors are used in digital circuits they usually operate in the ………….

1. active region
2. breakdown region
3. saturation and cutoff regions
4. linear region

Answer : 3

Q47. Three different Q points are shown on a dc load line. The upper Q point represents the ………….

1. minimum current gain
2. intermediate current gain
3. maximum current gain
4. cutoff point

Answer : 3

Q48. A transistor has a β_{DC} of 250 and a base current, I_B, of 20 μ A. The collector current, I_C, equals to …………….

1. 500 μA
2. 5 mA
3. 50 mA
4. 5 A

Answer : 2

Q49. A current ratio of I_C/I_E is usually less than one and is called …………

1. beta
2. theta
3. alpha
4. omega

Answer : 3

Q50. With the positive probe on an NPN base, an ohmmeter reading between the other transistor terminals should be ……

1. open
2. infinite
3. low resistance

4. high resistance

Answer : 3

Q51. In a CE configuration, an emitter resistor is used for ……

1. stabilization
2. ac signal bypass
3. collector bias
4. higher gain

Answer : 1

Q52. Voltage-divider bias provides ……….

1. an unstable Q point
2. a stable Q point
3. a Q point that easily varies with changes in the transistor's current gain
4. a Q point that is stable and easily varies with changes in the transistor's current gain

Answer : 2

Q53. To operate properly, a transistor's base-emitter junction must be forward biased with reverse bias applied to which junction?

1. collector-emitter
2. base-collector
3. base-emitter
4. collector-base

Answer : 4

Q54. The ends of a load line drawn on a family of curves determine ……

1. saturation and cutoff
2. the operating point
3. the power curve
4. the amplification factor

Answer : 1

Q55. If V_{CC} = +18 V, voltage-divider resistor R_1 is 4.7 kΩ, and R_2 is 1500Ω, then the base bias voltage is ……….

1. 8.7 V
2. 4.35 V
3. 2.9 V
4. 0.7 V

Answer: 2

Q56. The C-B configuration is used to provide which type of gain?

1. voltage
2. current
3. resistance
4. power

Answer : 1

Q57. The Q point on a load line may be used to determine …………

1. V_C
2. V_{CC}

3. V_B
4. I_C

Answer : 3

Q58. A transistor may be used as a switching device or as a …………

1. fixed resistor
2. tuning device
3. rectifier
4. variable resistor

Answer : 4

Q59. If an input signal ranges from 20–40 µ A (microamps), with an output signal ranging from .5–1.5 mA (milliamps), what is the ac beta?

1. 0.05
2. 20
3. 50
4. 500

Answer : 3

Q60. Beta's current ratio is ……..

1. I_C/I_B
2. I_C/I_E
3. I_B/I_E
4. I_E/I_B

Answer: 1

Q61. A collector characteristic curve is a graph showing ………..

1. emitter current (I_E) versus collector-emitter voltage (V_{CE}) with (V_{BB}) base bias voltage held constant
2. collector current (I_C) versus collector-emitter voltage (V_{CE}) with (V_{BB}) base bias voltage held constant
3. collector current (I_C) versus collector-emitter voltage (V_C) with (V_{BB}) base bias voltage held constant
4. collector current (I_C) versus collector-emitter voltage (V_{CC}) with (V_{BB}) base bias voltage held constant

Answer: 2

Q62. With low-power transistor packages, the base terminal is usually the ……….

1. tab end
2. middle
3. right end
4. stud mount

Answer: 2

Q63. When a silicon diode is forward biased, V_{BE} for a CE configuration is ……..

1. voltage-divider bias
2. 0.4 V
3. 0.7 V
4. emitter voltage

Answer: 3

Q64. What is the current gain for a common-base configuration where I_E = 4.2 mA and I_C = 4.0 mA?

1. 16.8
2. 1.05
3. 0.2
4. 0.95

Answer: 4

Q65. With a PNP circuit, the most positive voltage is probably …………

1. ground
2. V_C
3. V_{BE}
4. V_{CC}

Answer: 1

Q66. If a 2 mV signal produces a 2 V output, what is the voltage gain?

1. 0.001
2. 0.004
3. 100
4. 1000

Answer: 4

Q67. Most of the electrons in the base of an NPN transistor flow …………

1. out of the base lead
2. into the collector
3. into the emitter
4. into the base supply

Answer: 2

Q68. In a transistor, collector current is controlled by ………..

1. collector voltage
2. base current
3. collector resistance
4. all of the above

Answer: 2

Q69. Total emitter current is …………

1. $I_E - I_C$
2. $I_C + I_E$
3. $I_B + I_C$
4. $I_B - I_C$

Answer: 3

Q70. Often a common-collector will be the last stage before the load; the main function(s) of this stage is to ………….

1. provide voltage gain
2. provide phase inversion
3. provide a high-frequency path to improve the frequency response

4. buffer the voltage amplifiers from the low-resistance load and provide impedance matching for maximum power transfer

Answer: 4

Q71. For a CC configuration to operate properly, the collector-base junction should be reverse biased, while forward bias should be applied to …………… junction.

1. collector-emitter
2. base-emitter
3. collector-base
4. cathode-anode

Answer: 1

Q72. The input/output relationship of the common-collector and common-base amplifiers is ………..

1. 270 degrees
2. 180 degrees
3. 90 degrees
4. 0 degrees

Answer: 4

Q73. If a transistor operates at the middle of the dc load line, a decrease in the current gain will move the Q point ………….

1. off the load line
2. nowhere
3. up
4. down

Answer: 4

Q74. Which is the higher gain provided by a CE configuration?

1. voltage
2. current
3. resistance
4. power

Answer: 4

Q75. What is the collector current for a CE configuration with a beta of 100 and a base current of 30 μA?

1. 30 μA
2. 0.3 μA
3. 3 mA
4. 3 MA

Answer: 3

76. Which transistor region is very thin and lightly doped?
A) the emitter region
B) the collector region
C) the another region
D) the base region

77. In a transistor which is the largest of all doped regions
A) the emitter region
B) the collector region
C) the gate region
D) the base region

78. which region in a transistor is most heavily doped
A) the emitter region
B) the collector region
C) the gate region
D) the base region

79. Emitter bias with two power supplies provides a
A) very unstable Q point
B) very stable Q point
C) large base voltage
D) none of the above

80. For a transistor to function as an amplifier
A) both the EB and CB junction must be forward biased
B) both the EB and CB junction must be reverse biased
C) the EB junction must be forward bias and the CB junction must be reverse biased
D) the CB junction must be forward bias and the EB junction must be reverse biased

81. For a typical transistor which two currents and nearly the same
A) base current and emitter current
B) base current and collector current
C) collector current and emitter current
D) none of the above

82. The alpha dc of a transistor equals
A) collector current divided by emitter current { the ratio I/I is dc alpha (α) }
B) base current divided by collector current
C) emitter current divide by collector current
D) collector current divide by base current
8. When transistor is in saturation,
A) Vce =Vcc
B) Ic =0A
C) Vce =0V
D) Vce =1/2 Vcc

83. A transistor has the base current equal to 20 milliampere and collector current equal to 4.98 ampere ,Calculate emitter current.
A)10A
B) 20A
C) 5A Hint : (emitter current equal to base current + collector current)
D) 22.5mA

84. A transistor has emitter current equal to 15 ampere and base current equal to 60 micro ampere ,calculate alpha DC.

A) 0.996 Hint :alpha dc equal to collector current divide by emitter current, also collector current equal to emitter current – base current

B) 200

C) 199

D) 5mA

85. Transistor has collector current 10 mA base current 50 microampere , calculate beta DC.

A) 0.996

B) 200 Hint : beta DC equal to collector current divide by base current

C) 199

D) 11.25 microampere

86. A transistor has alpha DC equal to 0.995, calculate beta DC

A) 0.99

B) 0.97

C) 200

D) 199

Hint : beta DC equal to alpha DC divide by (1 – alpha DC)

87. A transistor is made up of three regions emitter, base and collector.

A) base is a very thin layer

B) emitter is lightly doped region

C) collector is the moderate in size

D) all are true

88. In what operating region does the collector of a transistor act like a current source.

A) **active region**

B) cutoff region

C) saturation region

E) the breakdown region

89. Which of the following biasing techniques produce the most unstable Q point.

A) voltage divider bias

B) emitter bias

C) collector bias

D) **Base bias**

90. When the collector current in a transistor is zero ,the transistor is

A) **cut off**

B) saturated

C) operating in the breakdown region

D) either b or c

91. For a transistor operating in the active region,

A) collector current equal to beta DC x base current

B) Vcc has little or no effect on the value of collector current

C) collector current is controlled by Vcc

D) **both a and b**

92. In a transistor amplifier ,what happens to the collector voltage ,when the collector current increases?
A) collector voltage increases
B) collector voltage stays the same
C) **collector voltage decreases**
D) this is impossible to determine

93. On the symbol of PNP transistor
A) arrow points out on the emitter lead
B) arrow points out on the collector lead
C) arrow points in on the base lead
D) **arrow points in on the emitter lead**

94. A BJT has
A) only one PN junction
B) three PN junctions
C) no PN junction
D) **two PN junctions**

95. In a transistor which current is the largest
A) collector current
B) base current
C) **emitter current**
D) diode current

96. In a transistor the line to which an arrowhead is marked is called
A) **emitter**
B) collector
C) base
D) gate
97. If a emitter current in a transistor is 2mA , the collector current will be nearly
A) **2mA**
B) 4mA
C) 0.01mA
D) 8mA

98. In a transistor with normal biasing, the
A) emitter junction has high and collector junction has low resistance
B) **emitter junction has low and collector junction has high resistance**
C) both emitter and collector junctions have low resistance
D) both emitter and collector junctions have high resistance

99. The most commonly used transistor circuit arrangement is
A) common base
B) **common emitter**
C) common collector
D) none of these

100. For transistor action,

A) the base region must be very thin and lightly doped
B) the emitter junction should be forward biased and collector junction should be reverse baised
C) the emitter should be heavily doped so that it can supply the required amount of majority carriers
D) **all of these**

101. The magnitude of leakage current in collector base junction with emitter open is
A) depends largely upon the emitter doping
depends largely upon the emitter base junction bias potential
C) increases with the increase in temperature
D) is generally greater in silicon than germanium transistor

102. The silicon transistors are more widely used than germanium transistors because
A) they have smaller leakage current
B) they have smaller depletion layers
C) they have better ability to dissipate heat
D) they have larger current carrying capacity

103. A transistor when connected in CE mode has
A) a low input resistance and low output resistance
B) a high input resistance and high output resistance
C)high input resistance and low output resistance
D) a medium input resistance and high output resistance

104. A CE amplifier circuits are preferred over CB amplifier circuits because they have
A) lower amplification factor
B) larger amplification factor
C) high input resistance and low output resistance
D) none of these

105. The main current crossing the collector junction in a normally biased NPN transistor is
A) diffusion current
B) **drift current**
C) hole current
D) equal to the base current

106. The emitter region in the PNP junction transistor is more heavily doped then the base region so that
A) the flow across the base region will be mainly because of electrons
B) **the flow across the base region will be mainly because of holes**
C) recombination will be increased in the base region
D) base current will be high

107. For a given emitter current, the collector current will be higher if
A) the recombination rate in the base region were decreased
B) the emitter region were more lightly doped
C) the minority carrier mobility in the base region were reduced
D) the base region were made wider

108. A small increase in the collector reverse bias will cause
A) a large increase in emitter current
B) a large increase in collector current
C) a large decrease in collector current
D) very small change in collector reverse saturation current

109. The input and output signals of a common emitter amplifier are
A) always equal
B) out of phase
C) always negative
D) in phase

110. A transistor is connected in common base configuration has
A) a low input resistance and high output resistance
B) high input resistance and low output resistance
C) a low input resistance and low output resistance
D) high input resistance and high output resistance

111. A transistor is said to be in quiescent state when
A) **no signal is applied to the input**
B) it is unbiased
C) no currents are flowing
D) emitter junction bias is just equal to collector junction bias

112. The voltage gain of a transistor connected in common collector arrangement is
A) equal to 1
B) more than 10
C) more than 100
D) less than 1

113. The phase difference between the input and the output voltage of transistor in common collector configuration is
A) zero degree
B) 180 degree
C) 90 degree
D) 270 degree

114. BC 147 transistor indicates that it is made of …
A) germanium
B) silicon
C) carbon
D) none of these

115. Heat sink used with the transistor to
A) increase the forward current
B) decrease the forward current
C) compensate for excessive doping
D) prevent excessive temperature rise

116. An amplifier should have
A) high fidelity
B) low noise
C) stable operation
D) all of the above

117. The power gain of an amplifier is 40 and its voltage gain is 200.The current gain will be
A)8000
B)5
C)1/5
D)1/8

118. A transistor amplifier with 85% efficiency is likely to be a
A) Class A
B) Class B
C)Class C
D)Class AB

119. In case of amplifier which coupling gives the highest gain
A) Transformer coupling
B) Resistance coupling
C)Impedance coupling
D)Capacitance coupling

120. The push pull amplifier is biased
A) Class A
B) Class AB
C)Class C
D)Class B

121. Logarithmic Amplifier are used in
A) adders
B) dividers
C)multipliers
D)all of the above

122. Decibels is defined in terms of
A) voltage ratio
B) current ratio
C)power ratio
D)any of the above

FET Based MCQ

1. The transconductance of FET depends upon

A. Drain supply
B. The type of FET
C. Gate to source voltage
D. Gate current

C. Gate to source voltage

2. The voltage gain of casade amplifier using FET is

A. Product of two voltage gains
B. Equal to C.D amplifier
C. Almost equal to C.S amplifier
D. None of the above

A. Product of two voltage gains

3. A FET is a...........controlled device whereas a bipolar transistor is a............controlled device.

A. Current, voltage
B. Drain, gate
C. Gate, drain
D. Voltage, current

D. Voltage, current

4. In FET the drain voltage above which there is no increase in the drain current is called........ voltage

A. Critical
B. Pinch off
C. Breakdown
D. Pick off

B. Pinch off

5. FET acts as constant current source in

A. Ohmic region
B. Breakdown region
C. Pinch off region
D. Both (b) and (c)

A. Ohmic region

6. The gate input current of a FET is of the order of

A. Amperes
B. Microamperes
C. Milliamperes
D. Hundreds of nano amperes

D. Hundreds of nano amperes

7. Which of the following is the common features between FETs and bipolar?

A. Difficult to bias
B. Low voltage gain
C. Low input impedance
D. Current controlled devices

Current controlled devices

8. In the ohmic region, the FET can be used as

A. Voltage variable capacitor
B. Voltage variable inductor
C. Voltage variable resistor
D. None of the above

C. Voltage variable resistor

9. The drain of FET is analogous to......... of BJT

A. Emitter
B. Base
C. Collector
D. Substrate

C. Collector

10. FETs are preferred to BJTs at high frequencies because they are

A. Less noisy
B. Capable of handling highest frequencies
C. Easy to fabricate
D. All of the above

A. Less noisy

11. In P-channel FET the current is due to

A. Electrons
B. Holes
C. Both holes and electrons
D. Either holes or electrons

B. Holes

12. In a FET

A. The channel is lightly doped and gate is heavily doped
B. The channel is lightly doped and gate is lightly doped
C. The channel is heavily doped and gate is lightly doped
D. The channel is heavily doped and gate is heavily doped

A. The channel is lightly doped and gate is heavily doped

13. In a FET

A. One junction has reverse bias on one side and forward bias on the other
B. Both the junctions are reverse biased
C. One junction has reverse bias on both sides of the junction
D. One junction is reverse biased and the other forward biased

C.One junction has reverse bias on both sides of the junction

14. A FET

A. Depends on the variation of a magnetic field for its operation
B. Has three P-N junctions
C. Depends on the variation of the depletion layer width with reverse voltage, for its operation
D. Has two P-N junctions

A. Depends on the variation of a magnetic field for its operation

15. n-channel FETs are superior to p-channel FETs because

A. They have high switching time
B. Mobility of electrons is greater than that of holes
C. They consume less power
D. Mobility of electrons is smaller than that of holes

B.Mobility of electrons is greater than that of holes

16. A FET differs from a bipolar transistor as it has

A. Simpler fabrication
B. Negative resistance
C. High input impedance
D. Any of the above

C.High input impedance

17. N-channel FETs are superior to P-channel FETs because

A. They have a higher switching
B. They have a higher input impedance
C. Mobility of electron is greater than that of holes

D. All of the above

C.Mobility of electron is greater than that of holes

18. A FET can be used as a variable

A. Inductor
B. Capacitor
C. Resistor
D. Voltage source
E. Current source

C.Voltage source

19. A FET, for its operation, depends on the variation of

A. Forward-biased junction
B. Reversed-biased junction
C. Magnetic field
D. The depletion-layer width with reverse voltage

D.The depletion-layer width with reverse voltage

20. Which of the following is not the main characteristic of FET?

A. Amplification factor
B. Forward transconductance
C. Temperature factor
D. None of the above

C.Temperature factor

21. The primary control on drain current in a JFET is exerted by which of the following?

A. Gate reverse bias
B. Size of depletion regions
C. Voltage drop across channel
D. Channel resistance

A.Gate reverse bias

22. In a JFET, gates are always

A. Unbiased
B. Reverse biased
C. Either forward or reverse biased
D. Forward biased

B.Reverse biased

23. The main disadvantage of a JFET is

A. Low gain-band width product
B. Low gain
C. High cost
D. High noise level

A.Low gain-band width product

24. The transconductance curve of a JFET is

A. Inverted V-type
B. Parabolic
C. Hyperbolic
D. A straight line

B. Parabolic

25. Three terminals of a JFET are

A. Pole, dipole and bipole
B. Emitter, collector and base
C. Source, drain and current
D. Top, base and side

C.Source, drain and current

26. The input resistance of JFET ideally approaches

A. Zero
B. 5 ohms
C. 200 ohms
D. Infinity

D.Infinity

27. For a JFET, above the pinch-off voltage, the

A. Drain current remains constant
B. Drain current decreases
C. Drain current increases
D. Drain current varies parabolically

A.Drain current remains constant

28. For holding the drain current constant inspite of large changes in JFET parameters

A. Current source bias is used
B. Reverse bias is used
C. Voltage divider bias is used
D. No bias is used

A.Current source bias is used

29. JFETs cascode means

A. Two FETs connected in parallel
B. A common gate driving a common source connection
C. A common gate source driving a common gate connection
D. None of the above

C.A common gate source driving a common gate connection

30. The operation of a JFET involves a flow of

A. Recombination carriers
B. Majority carriers
C. Minority carriers
D. Any of the above

B.Majority carriers

31. Saturation region of a JFET is also known as.........region

A. Pinch off
B. Analog
C. Source
D. Ohmic

D.Ohmic

32. A JFET can operate in

A. Only depletion mode
B. Only enhancement mode
C. Both depletion and enhancement modes
D. Neither depletion nor enhancement modes

A.Only depletion mode

33. The characteristics of JFET are similar to

A. MOSFET
B. SCR
C. Triode
D. Pentode

D.Pentode

34. When a JFET is pinched off, the depletion layers are

A. Conducting
B. Close together

C. Touching
D. Far apart

B.Close together

35. Whenever a JFET operates above pinch-off voltage

A. Drain current starts decreasing
B. Drain current increases steeply
C. Depletion regions become smaller
D. Drain current remains nearly constant

D.Drain current remains nearly constant

36. The drain current of the N-channel JFET increases with

A. Increasing positive voltage at the gate
B. Constant voltage at the gate
C. Decreasing positive voltage at the gate
D. None of the above

A.Increasing positive voltage at the gate

37. The JFET is a

A. Unipolar device
B. Tripolar device
C. Bipolar device
D. None of the above

A.Tripolar device

38. When the positive voltage on the gate of a P-channel JFET is increased, the drain current will

A. Remain same
B. Decrease
C. Increase
D. Any of the above

B.Decrease

39. When a JFET is cut off, it's like an .... switch and when it is saturated, it's like a .... switch

A. Closed, closed
B. Open, closed
C. Open, open
D. Closed, open

B.Open, closed

40. The gate-source diode of a JFET should be

A. Unbiased
B. Reverse biased
C. Forward biased
D. None of the above

B.Reverse biased

41. The input impedance of an ideal JFET

A. Is impossible to predict
B. Approaches unity
C. Approaches infinity
D. Approaches zero

C.Approaches infinity

42. The main use of a JFET is with a

A. Trigger
B. Source follower
C. Snubber
D. Frequency mixer

B.Source follower

43. One of the major applications of JEFT is in

A. Switching
B. Electron flow regulation
C. Constant voltage source
D. Constant current source

A.Switching

44. The JFETs are normally used in

A. Cut-off region
B. Saturation region
C. Ohmic gate
D. None of the above

B.Saturation region

45. The name field effect is related to the .... layers of a JFET

A. Depletion
B. Gate
C. Source

D. Drain

A.Depletion

46. The JFET is also known as square law device because its

A. Drain current varies as square of the gate source voltage
B. Transconductance curve is parabolic
C. Reverse gate leakage current varies as square of reverse gate voltage
D. Drain current varies as square of its drain voltage for a fixed Vgs

B.Transconductance curve is parabolic

47. The charge carriers in an N-channel JFET are

A. Electrons
B. Neutrons
C. Protons
D. Holes

A.Electrons

48. The preferred from of biasing a JFET amplifier is ..... bias

A. Self
B. Drain
C. Source
D. Gate

C.Source

49. As compared to a bipolar transistor, a JFET is

A. Equally sensitive to changes in input voltage
B. More sensitive changes in input voltage
C. Less sensitive changes in input voltage
D. Highly sensitive to changes in input voltage

C.Less sensitive changes in input voltage

50. In saturation region JFET acts like a
A. Switch
B. Short circuit
C. Bipolar device
D. Resistance

D.Resistance

Q1. What do you know about field-effect transistor (FET)?
A. a type of transistor which uses an electric field to control the flow of current

B. voltage
C. Current
D. None of the above

Q2. FET acts as constant current source in ___.
A. Ohmic region
B. Breakdown region
C. Pinch off region
D. All of the above

Q3. Which of the following is the common features between FETs and bipolars?
A. Difficult to bias
B. Low voltage gain
C. Low input impedance
D. Current controlled devices

Q4. Is FETs are preferred to BJTs at high frequencies because they are less noisy?
A. Yes
B. No

Q5. FETs are preferred to BJTs at high frequencies because they are ___.
A. less noisy
B. capable of handling highest frequencies
C. easy to fabricate
D. All of the above

Q6. A JFET has three terminals, namely ____.
A. cathode, anode, grid
B. emitter, base, collector
C. source, gate, drain
D. None of the above

Q7. The gate of a JFET is ___ biased.
A. reverse
B. forward
C. reverse as well as forward
D. None of the above

Q8. In saturation region JFET acts like a ___.
A. Switch
B. Short circuit
C. Bipolar device
D. Resistance

Q9. The input impedance of an ideal JFET ___.
A. is impossible to predict
B. approaches unity
C. approaches infinity
D. approaches zero

Q10. The name field effect is related to the ____ layers of a JFET.
A. depletion
B. gate
C. source
D. drain

Q11. MOSFET is a three-terminal device with gate (G), drain (D) and source (S) terminals.
A. True
B. False

Q12. Which of the following devices has the highest input impedance?
A. JFET
B. MOSFET
C. Crystal diode
D. ordinary transistor

Q13. A MOSFET uses the electric field of a ___ to control the channel current.
A. capacitor
B. battery
C. generator
D. All of the above

Q14. What is the full form of MOSFET?
A. metal–oxide–semiconductor field-effect transistor
B. metal–oxygen–semiconductor field-effect transistor
C. metal–oxide–semi field-effect transistor
D. All of the above

Q15. The source terminal of a JEFT corresponds to cathode of a vacuum tube.
A. True
B. False

Q16. The type of bias most often used with E-MOSFET circuits is ___.
A. constant current
B. drain-feedback
C. voltage-divider
D. zero biasing

Q17. The operation of a JFET involves a flow of ___.
A. Recombination carriers
B. Majority carriers
C. Minority carriers
D. All of the above

Q18. A FET differs from a bipolar transistor as it has ____.
A. simpler fabrication
B. negative resistance
C. high input impedance
D. All of the above

Q19. N-channel FETs are superior to P-channel FETs because ____.
A. these have a higher switching
B. these have a higher input impedance
C. mobility of electron is greater than that of holes
D. All of the above

Q20. A FET can be used as a variable ___.
A. Inductor
B. Capacitor
C. Voltage source
D. Current source

UNIT III

Op-Amp

Multiple Choice Questions

1. An ideal op-amp should have
   (a) zero input and output impedance
   (b) infinite input impedance and zero output impedance
   (c) infinite input and output impedance
   (d) zero input and infinite output impedance
2. An ideal op-amp should have
   (a) low gain at low frequencies
   (b) low gain at low frequencies and high gain at high frequencies
   (c) high gain at low frequencies and low gain at high frequencies
   (d) high gain at all frequencies
3. The common-mode rejection ratio of an op-amp is
   (c) unity (b) much greater than unity
   (e) much smaller than unity (d) none of the above
4. An ideal op-amp should have
   (a) infinite gain at all frequencies
   (b) infinite bandwidth
   (c) zero phase shift
   (d) all the above
5. If an op-amp comparator has a gain of 100,000, an input difference of 0.2 mV above reference, and a supply of $\pm$12 V, the output will be
   (a) 20 V (b) 12 V
   (c) 10 V (d) 15 V
6. What circuit produces an output that approximates the area under the curve of an input function?
   (b) integrator (b) differentiator
   (d) Summing amplifier (d) comparator
7. The ramp voltage at the output of an op-amp integrator
   (a) increases or decreases at a linear rate
   (b) increases or decreases exponentially

(c) is always increasing and never decreasing

(d) is constant

8. A differentiator is used to measure

(a) the sum of the input voltages

(b) the difference between two voltages

(c) the area under a curve

(d) the rate of change of the input voltage

9. An integrator circuit

(c) uses a resistor in its feedback circuit

(d) uses an inductor in its feedback circuit

(e) uses a capacitor in its feedback circuit

(f) uses a resistor in its feedback circuit or uses a capacitor in its feedback circuit

10. The large signal bandwidth of an op-amp is limited by its

(a) Loop gain (b) slew rate

(c) output impedance (d) input frequency

11. The 'slew rate' of an operational amplifier indicates

(a) how fast its output current can change

(b) how fast its output impedance can change

(c) how fast its output power can change

(d) how fast its output voltage can change

when a step input signal is given.

12. A differential amplifier, amplifies

(a) and mathematically differentiates the average of the voltages on the two input lines

(b) and differentiates the input waveform on one line when the other line is grounded

(c) the difference of voltages between the two input lines

(d) and differentiates the sum of the two input waveforms

Answers

Multiple Choice Questions

1.(b) 2. (d) 3. (b) 4. (d) 5.(b) 6. (a) 7. (a) 8.(d) 9.(c) 10. (b)
11.(d) 12.(c)

Microprocessor Basics

1. What is true about microprocessor?

A. Microprocessor is a controlling unit of a micro-computer
B. It is fabricated on a small chip capable of performing ALU (Arithmetic Logical Unit) operations
C. It also communicates with the other devices connected to it.
D. All of the above

Ans : D

Explanation: Microprocessor is a controlling unit of a micro-computer, fabricated on a small chip capable of performing ALU (Arithmetic Logical Unit) operations and communicating with the other devices connected to it.

2. Microprocessor consists of?

A. ALU
B. register array
C. control unit
D. All of the above

Ans : D

Explanation: Microprocessor consists of an ALU, register array, and a control unit.

3. The __________ controls the flow of data and instructions within the computer.

A. control unit
B. register array
C. accumulator
D. ALU

Ans : A

Explanation: The control unit controls the flow of data and instructions within the computer.

4. Which of the following is not a feature of a Microprocessor?

A. Versatility
B. Reliability
C. Low Bandwidth
D. Low Power Consumption

Ans : C

Explanation: low bandwidth is not a feature of a Microprocessor

5. The microprocessor ___________ those instructions from the memory

A. Fetch
B. Decode
C. Execute
D. None of the above

Ans: A

Explanation: The microprocessor fetches those instructions from the memory, then decodes it

6. It determines the number of operations per second?

A. Bandwidth
B. Word Length
C. Clock Speed
D. Operations Speed

Ans : C

Explanation: Clock Speed : It determines the number of operations per second the processor can perform. It is expressed in megahertz (MHz) or gigahertz (GHz).

7. Clock Speed is also known as?

A. Clock Rate.
B. Clock Length.
C. Clock Set.
D. Clock Type.

Ans : A

Explanation: Clock Speed : It determines the number of operations per second the processor can perform. It is expressed in megahertz (MHz) or gigahertz (GHz).It is also known as Clock Rate.

8. An 8-bit microprocessor can process _____ data at a time.

A. 4-bit
B. 8-bit
C. 16-bit
D. All of the above

Ans : B

Explanation: An 8-bit microprocessor can process 8-bit data at a time.

9. The number of bits processed in a single instruction is known as ?

A. Instruction Set
B. Bandwidth
C. Bandspeed
D. Instruction Speed

Ans : B

Explanation: Bandwidth : It is the number of bits processed in a single instruction.

10. What is false about microprocessor?

A. The microprocessor is of small size chip, hence is not portable.
B. microprocessor chips are available at low prices
C. microprocessors are versatile
D. failure rate of an IC in microprocessors is very low

Ans : A

Explanation: The microprocessor is of small size chip, hence is portable.

Microcontroller Basics

1. A microcontroller at-least should consist of:
a) RAM, ROM, I/O ports and timers
b) CPU, RAM, I/O ports and timers
c) CPU, RAM, ROM, I/O ports and timers
d) CPU, ROM, I/O ports and timers

Answer: c
Explanation: A microcontroller at-least consists of a processor as its CPU with RAM, ROM, I/O ports and timers. It may contain some additional peripherals like ADC, PWM, etc.

2. Unlike microprocessors, microcontrollers make use of batteries because they have:
a) high power dissipation
b) low power consumption
c) low voltage consumption
d) low current consumption

Answer: b
Explanation: Micro Controllers are made by using the concept of VLSI technology. So here, CMOS based logic gates are coupled together by this technique that consumes low power.

3. What is the order decided by a processor or the CPU of a controller to execute an instruction?
a) decode, fetch, execute
b) execute, fetch, decode
c) fetch, execute, decode

d) fetch, decode, execute

Answer: d
Explanation: First instruction is fetched from Program Memory. After fetching, instruction is decoded to generate control signals to perform the intended task. After decoding, instruction is executed and the complete intended task of that particular instruction.

4. If we say microcontroller is 8-bit then here 8-bit denotes size of:
a) Data Bus
b) ALU
c) Control Bus
d) Address Bus

Answer: b
Explanation: If we say a microcontroller is 8-bit it means that it is capable of processing 8-bit data at a time. Data processing is the task of ALU and if ALU is able to process 8-bit data then the data bus should be 8-bit wide. In most books it tells that size of data bus but to be precise it is the size of ALU because in Harvard Architecture there are two sets of data bus which can be of same size but it is not mandatory.

5. How are the performance and the computer capability affected by increasing its internal bus width?
a) it increases and turns better
b) it decreases
c) remains the same
d) internal bus width doesn't affect the performance in any way

Answer: a
Explanation: As the bus width increases, the number of bits carried by bus at a time increases as a result of which the total performance and computer capability increases.

6. Abbreviate CISC and RISC.
a) Complete Instruction Set Computer, Reduced Instruction Set Computer
b) Complex Instruction Set Computer, Reduced Instruction Set Computer
c) Complex Instruction Set Computer, Reliable Instruction Set Computer
d) Complete Instruction Set Computer, Reliable Instruction Set Computer

Answer: b
Explanation: CISC means Complete Instruction Set Computer because in this a microcontroller has an instruction set that supports many addressing modes for the arithmetic and logical instructions, data transfer and memory accesses instructions. RISC means Reduced Instruction Set Computer because here a microcontroller has an instruction set that supports fewer addressing modes for the arithmetic and logical instructions and for data transfer instructions.

7. Give the names of the buses present in a controller for transferring data from one place to another?

a) data bus, address bus
b) data bus
c) data bus, address bus, control bus
d) address bus

Answer: c
Explanation: There are 3 buses present in a microcontroller they are data bus (for carrying data from one place to another), address bus (for carrying the address to which the data will flow) and the control bus (which tells the controller to execute which type of work at that address may be it read or write operation).

8. What is the file extension that is loaded in a microcontroller for executing any instruction?
a) .doc
b) .c
c) .txt
d) .hex

Answer: d
Explanation: Microcontrollers are loaded with .hex extension as they understand the language of 0's and 1's only.

9. What is the most appropriate criterion for choosing the right microcontroller of our choice?
a) speed
b) availability
c) ease with the product
d) all of the mentioned

Answer: d
Explanation: For choosing the right microcontroller for our product we must consider its speed so that the instructions may be executed in the least possible time. It also depends on the availability so that the particular product may be available in our neighboring regions or market in our need. It also depends on the compatibility with the product so that the best results may be obtained.

10. Why microcontrollers are not called general purpose computers?
a) because they have built in RAM and ROM
b) because they design to perform dedicated task
c) because they are cheap
d) because they consume low power

Answer: b
Explanation: Microcontrollers are designed to perform dedicated tasks. While designing general purpose computers end use is not known to designers.

Introduction of IoT System

1) How many numbers of the element in the open IoT architecture?

a. Four elements
b. Five elements
c. Six elements
d. Seven elements

Answer: (d) Seven elements

Description: There are seven numbers of elements in the open IoT architecture:

1. Configuration and monitoring
2. Cloud data storage
3. Scheduler
4. Request definition
5. Request presentation
6. Service delivery and utility manager
7. Sensor middleware (X-GSN)

2) Which of the following is the way in which an IoT device is associated with data?

a. Internet
b. Cloud
c. Automata
d. Network

Answer: (b) Cloud

Description: Cloud-based services provide a way for IoT devices to be connected to data. For example: Just as the WWW (World Wide Web) runs on the Internet, so does IoT.

3) Which of the following IoT networks has a very short range?

a. Short Network
b. LPWAN
c. SigFox
d. Short-range Wireless Network

Answer: (d) Short Range Wireless Network

Description: Short-range wireless networks have a very short range. This type of network is used for applications running in the local environment. The best example of this network is Wi-Fi and Bluetooth.

4) What is the full form of the LPWAN?

a. Low Protocol Wide Area Network
b. Low Power Wide Area Network
c. Long Protocol Wide Area Network
d. Long Power Wide Area Network

Answer: (b) Low Power Wide Area Network

Description: The full form of the LPWAN is Low Power Wide Area Network. LPWAN is a type of wireless telecommunication, and it is specially designed for M2M (Machine to Machine) and IoT devices.

5) An IoT network is a collection of ______ devices.

a. Signal
b. Machine to Machine
c. Interconnected
d. Network to Network

Answer: (c) Interconnected

Description: An IoT network is a collection of interconnected devices that communicate with other devices without human involvement.

6) Which one of the following is not an IoT device?

a. Amazon echo voice controller
b. Google Home
c. Nest Smoke Alarm
d. None of these

Answer: (d) None of the these

Description: These are all IoT devices. Google Home is a smart speaker that obeys all the commands given by the user. The Amazon Echo Voice Controller is also a smart speaker. The Nest Smoke Alarm is an IoT device that sends a smoke alert message to the user when a fire occurs.

7) What is the main purpose of WoT (Web of Things) in the IoT?

a. Improve the usability and interoperability
b. Reduce the security
c. Complex the development
d. Increase the cost

Answer: (a) Improve the usability and interoperability

Description: The main purpose of the Web of Things is to improve the usability and interoperability in IoT. Developing IoT Apps through WoT is much easier, faster, and less expensive.

8) What is the Arduino UNO?

a. Software
b. Hardware device
c. Network
d. Protocol

Answer: (b) Hardware device

Description: The Arduino Uno is a hardware device that is based on the Microchip ATmega328P microcontroller. It has been developed by Arduino.cc.

9) ______ allows the user to control electronic components.

a. Android API
b. RETful API
c. MQTT API
d. CoAP API

Answer: (b) RETful API

Description: The RETful API allows the user to control the electronic components connected to the Intel Galileo Gen 2 board via HTTP requests.

10) Which of the following is not an application of IoT?

a. Wearables
b. Smart Grid
c. Arduino
d. Smart City

Answer: (c) Arduino

Description: The Arduino Uno is a hardware device that is based on the Microchip ATmega328P microcontroller.

11) Which one of the following protocols is lightweight?

a. IP
b. HTTP
c. MQTT
d. CoAP

Answer: (c) MQTT

Description: The full form of the MQTT is Message Queue Telemetry Transport. It is a lightweight messaging protocol that runs over the TCP / IP protocol.

12) What is the role of Big Data in IoT's Smart Grid architecture?

a. Filter the data
b. Locked the data
c. Store data
d. None of the these

Answer: (c) Store data

Description: The main role of Big Data is to store data on a real-time basis. It uses multiple storage technologies to store the data.

13) What is the real example of a smart grid device in IoT?

a. Mobile phone
b. Television
c. Smart Speaker
d. Smart Meters

Answer: (d) Smart Meters

Description: Smart Grid is used to monitor the power supply. Consumers' data is collected using a smart grid, and that data is analyzed and distributed to the consumers. The real example of a smart grid device is a smart meter.

14) What is the full form of the MQTT?

a. Multi-Queue Telemetry Things
b. Multiple Queue Telemetry Things

c. Message Queue Telemetry Things
d. Message Queue Telemetry Transport

Answer: (d) Message Queue Telemetry Transport

Description: The full form of the MQTT is Message Queue Telemetry Transport. It is a lightweight messaging protocol that runs over the TCP / IP protocol.

15) What is the full form of ICT?

a. Inter Connect Technology
b. Internet Connection Topology
c. Information and Communication Technology
d. Infer Communication Topology

Answer: (c) Information and Communication Technology

Description: The full form of ICT is Information and Communication Technology. ICT is a multidimensional term for the IT sector that refers to all communication technologies, including the Internet, wireless networks, cell phones, computers, and software.

16) Which of the following layers provides end-to-end communication in IoT?

a. Logical layer
b. Data link layer
c. Transport layer
d. Session layer

Answer: (c) Transport layer

Description: The transport layer focuses on end-to-end communication, and it gives reliability and congestion avoidance that packets will be delivered in the same way as the user sent the packet.

17) Which of the following topology is used for ZigBee Smart Energy?

a. Bus Topology
b. Ring Topology
c. Star Topology
d. Any Topology

Answer: (c) Star Topology

Description: ZigBee Smart Energy is designed for a wide range of IoT applications. It supports a wide range of network topologies, such as star topology.

18) How many types of capacitive touch sensors in IoT?

a. Two types
b. Five types
c. Seven types
d. Nine types

Answer: (a) Two types

Description: Two types of capacitive touch sensors in IoT:

- Projected-capacitive sensing
- Surface-capacitive sensing

19) Which of the following is the example of a short-range wireless network?

a. VPN
b. Wi-Fi
c. Internet
d. WWW

Answer: (b) Wi-Fi

Description: Short-range wireless networks have a very short range. This type of network is used for applications running in the local environment. Examples of this network are Wi-Fi and Bluetooth.

Concept of Bluetooth

1). The frequency band of Bluetooth radio is around _______

- ○ 2.1 GHz
- ○ 2.3 GHz
- ● 2.4 GHz
- ○ None of the above

Hint

2). What are the benefits of Bluetooth technology?

- ○ Cable replacement, ease of file sharing
- ○ Internet connectivity

- ○ Low-cost technology
- ◉ All of the above

Hint

3). The network topologies are classified into __________

- ◉ Two
- ○ Three
- ○ Four
- ○ Five

Hint piconet scatternet

4). The single piconet formed by _________

- ◉ One slave and one master
- ○ One slave and multiple masters
- ○ Multiple slaves and one master
- ○ Multiple slaves and multiple masters

Hint

5). The multiple piconets formed by _________

- ○ One slave and one master
- ○ One slave and multiple masters
- ◉ Multiple slaves and one master
- ○ Multiple slaves and one master

Hint

6). The scatternet is a combination of ________

- ○ Single piconet
- ○ Double piconet
- ◉ Multiple piconet
- ○ None of the above

Hint

7). The spectrum used by Bluetooth starts from _______ and ends at ________

- ◉ 2402 MHz, 2483.5 MHZ
- ○ 2302 MHz, 2.483 MHZ
- ○ 2300 MHz, 2.400 MHZ
- ○ None of the above

Hint 2.402 GHz, 2.4835 GHZ

8). The Bluetooth devices uses _________ techniques

- ○ Spread spectrum technique

- (selected) Frequency hopping technique
- Direct Sequence spread spectrum
- None of the above

Hint

9). How many channels do Bluetooth consists?

- (selected) 79 channels
- 89 channels
- 99 channels
- None of the above

Hint

10). The architecture of Bluetooth is called ______

- Scatternet
- (selected) Piconet
- Master and slave
- None of the above

Hint

11). A _________ node is a node from which data is being sent

- (selected) Master node
- Slave node
- Master and slave node
- None of the above

Hint

13). In which node the data is being received?

- Master node
- (selected) Slave node
- Master and slave node
- None of the above

Hint

14). How many nodes do piconet consists of?

- Two nodes
- Three nodes
- Four nodes
- (selected) Eight nodes

Hint One master node seven slave node

15). The Bluetooth technologies used in _____

- Wireless keyboard

- Wireless mouse
- Headsets
- All of the above

Hint

16). What is the advantage of using Bluetooth technology?

- Wireless technology, cheap technology
- Very simple to form a piconet
- Robust, low energy consumption
- All of the above

Hint

17). What are the disadvantages of Bluetooth technology?

- Wireless technology, cheap technology
- Simple to use
- Low in bandwidth
- All of the above

18. An interconnected collection of piconet is called ___________

a) scatternet
b) micronet
c) mininet
d) multinet
View Answer

Answer: a
Explanation: Piconet is the basic unit of a bluetooth system having a master node and upto seven active slave nodes. A collection of piconets is called scatternet and a slave node of a piconet may act as a master in a piconet that is part of the scatternet.

19. In a piconet, there can be up to ________ parked nodes in the network.

a) 63
b) 127
c) 255
d) 511

Answer: c
Explanation: A slave node in a piconet can be instructed by the master node to go into parked mode. Then the slave node enters the parked mode in which the node is not disconnected from the network but is inactive unless the master wakes it up.

20. Bluetooth is the wireless technology for __________

a) local area network
b) personal area network

c) metropolitan area network
d) wide area network

Answer: b
Explanation: Bluetooth is a wireless technology used to create a wireless personal area network for data transfer up to a distance of 10 meters. It operates on 2.45 GHz frequency band for transmission.

21. Bluetooth uses __________
a) frequency hopping spread spectrum
b) orthogonal frequency division multiplexing
c) time division multiplexing
d) channel division multiplexing

Answer: a
Explanation: Frequency hopping spread spectrum is a method of transmitting radio signals by rapidly changing the carrier frequency and is controlled by the codes known to the sender and receiver only.

22. In a piconet, one master device ________
a) can not be slave
b) can be slave in another piconet
c) can be slave in the same piconet
d) can be master in another piconet
View Answer

Answer: b
Explanation: In a scatternet, a slave node of one piconet may act as a master in a piconet that is part of the scatternet. The scatternet uses this property to connect many piconets together to create a larger network.

23. Bluetooth supports _______
a) point-to-point connections
b) point-to-multipoint connection
c) both point-to-point connections and point-to-multipoint connection
d) multipoint to point connection
View Answer

Answer: c
Explanation: In Bluetooth, each slave node communicates with the master of the piconet independently i.e. each master-slave connection is independent. The slave is not allowed to communicate with other slaves directly.

24. A scatternet can have maximum __________
a) 10 piconets
b) 20 piconets
c) 30 piconets

d) 40 piconets
View Answer

Answer: a
Explanation: A scatternet can have maximum of 10 piconets and minimum of 2 piconets. To connect these piconets, a slave node of one piconet may act as a master in a piconet that is part of the scatternet.

Concept of Networking

1) Which of these is a standard interface for serial data transmission?

a. ASCII

b. RS232C

c. 2

d. Centronics

Answer: (b) RS232C

Explanation: The RS232C is a standard interface for serial data transmission that defines the protocol and physical interface for transmitting serial data fairly easily between associated appliances and computers.

2) Which type of topology is best suited for large businesses which must carefully control and coordinate the operation of distributed branch outlets?

a. Ring

b. Local area

c. Hierarchical

d. Star

Answer: (d) Star

Explanation: The star topology is the best network topology for large businesses because it is simple to control and coordinate from the central computer.

3) Which of the following transmission directions listed is not a legitimate channel?

a. Simplex

b. Half Duplex

c. Full Duplex

d. Double Duplex

Answer: (d) Double Duplex

Explanation: Double duplex is not a legitimate channel for transmission in computer network.

4) "Parity bits" are used for which of the following purposes?

a. Encryption of data

b. To transmit faster

c. To detect errors

d. To identify the user

Answer: (c) To detect errors

Explanation: The parity bit is also known as the check bit, and has a value of 0 or 1. It is used for error detection for blocks of data.

5) What kind of transmission medium is most appropriate to carry data in a computer network that is exposed to electrical interferences?

a. Unshielded twisted pair

b. Optical fiber

c. Coaxial cable

d. Microwave

Answer: (b) Optical fiber

Explanation: The optical fiber is made of glass or plastic. In this cable, the transmission of data occurs in the form of light rather than the electric current, so this cable provides higher data transfer speed than other cables.

6) A collection of hyperlinked documents on the internet forms the ?

a. World Wide Web (WWW)

b. E-mail system

c. Mailing list

d. Hypertext markup language

Answer: (a) World Wide Web (WWW)

Explanation: World Wide Web (WWW) creates a collection of hyperlinked documents on the Internet.

7) The location of a resource on the internet is given by its?

a. Protocol

b. URL

c. E-mail address

d. ICQ

Answer: (b) URL

Explanation: A URL (Uniform Resource Locator) is a database connection that describes the database's location on a computer network and the retrieval process. A URL is a different form of URI (Uniform Resource Identifier) although the two words are used interchangeably by many people.

8) The term HTTP stands for?

a. Hyper terminal tracing program

b. Hypertext tracing protocol

c. Hypertext transfer protocol

d. Hypertext transfer program

Answer: (c) Hypertext transfer protocol

Explanation: The term HTTP stands for Hypertext transfer protocol.

9) A proxy server is used as the computer?

a. with external access

b. acting as a backup

c. performing file handling

d. accessing user permissions

Answer: (a) with external access

Explanation: A proxy server is a computer that acts as a gateway between a user's computer and the Internet. The proxy server is also called application level gateway. By this the client computer can establish indirect network connection to another network.

10) Which one of the following would breach the integrity of a system?

a. Looking the room to prevent theft

b. Full access rights for all users

c. Fitting the system with an anti-theft device

d. Protecting the device against wilful or accidental damage

Answer: (b) Full access rights for all users

Explanation: None

11) Which software prevents the external access to a system?

a. Firewall

b. Gateway

c. Router

d. Virus checker

Answer: (a) Firewall

Explanation: A firewall is a network securing software that prevents unauthorized users and dangerous elements from accessing the network. Software firewall acts as a filter for our network which prevents harmful information.

12) Which one of the following is a valid email address?

a. javat@point.com

b. gmail.com

c. tpoint@.com

d. javatpoint@books

Answer: (a) javat@point.com

Explanation: A proper email address is a combination of the email prefix and email domain, both in appropriate formats. The domain appears to the right side of the @ symbol and the prefix appears to the left side of the @ symbol.

For example, in this email address javat@point.com, "javat" is the prefix, and "point.com" is the domain.

13) Which of the following best describes uploading information?

a. Sorting data on a disk drive

b. Sending information to a host computer

c. Receiving information from a host computer

d. Sorting data on a hard drive

Answer: (b) Sending information to a host computer

Explanation: None

14) Which one of the following is the most common internet protocol?

a. HTML

b. NetBEUI

c. TCP/IP

d. IPX/SPX

Answer: (c) TCP/IP

Explanation: TCP/IP is the most common internet protocol because it is the most widely used network protocol.

15) Software programs that allow you to legally copy files and give them away at no cost are called which of the following?

a. Probe ware

b. Timeshare

c. Shareware

d. Public domain

Answer: (d) Public domain

Explanation: Public domain software can be modified, distributed or sold by anyone without any attention, but no one can ever own it.

16) The term FTP stands for?

a. File transfer program

b. File transmission protocol

c. File transfer protocol

d. File transfer protection

Answer: (c) File transfer protocol

Explanation: The term FTP stands for File transfer protocol.

17) At what speed does tele-computed refer?

a. Interface speed

b. Cycles per second

c. Baud rate

d. Megabyte load

Answer: (c) Baud rate

Explanation: In telecommunication, baud rate is a specific unit of the speed rate. It is one of the significant functions that determine the speed of the communication over the data channel.

18) Which one of the following is not a network topology?

a. Star

b. Ring

c. Bus

d.	Peer to Peer

Answer: (d) Peer to Peer

Explanation: Peer to Peer network is a network to which all computers are used the same resources and rights as other computers. Its network designed primarily for the small local area.

19) The maximum length (in bytes) of an IPv4 datagram is?

a.	32

b.	1024

c.	65535

d.	512

Answer: (c) 65535

Explanation: None

20) Which of the following statements could be valid with respect to the ICMP (Internet Control Message Protocol)?

1. It reports all errors which occur during transmission.
2. A redirect message is used when a router notices that a packet seems to have been routed wrongly.
3. It informs routers when an incorrect path has been taken.
4. The "destination unreachable" type message is used when a router cannot locate the destination.

Answer: (2) A redirect message is used when a router notices that a packet seems to have been routed wrongly.

Explanation: None

21) The IP network 192.168.50.0 is to be divided into 10 equal sized subnets. Which of the following subnet masks can be used for the above requirement?

a.	255.243.240

b.	255.255.0.0

c.	255.255.0

d.	255.255.255

Answer: (c) 255.255.255.0

Explanation: This address belongs to class C, so 8 bits are reserved for the host ID. 24 bits are reserved for network ID.

22) When the mail server sends mail to other mail servers it becomes ___ ?

a.	SMTP client

b. SMTP server

c. Peer

d. Master

Answer: (a) SMTP client

Explanation: The SMTP client is an organization that allows sending emails using the SMTP server. SMTP servers can't send emails to other SMTP servers separately. It is based on client-server architecture.

23) The length of an IPv6 address is?

a. 32 bits

b. 64 bits

c. 128 bits

d. 256 bits

Answer: (c) 128 bits

Explanation: An IPv6 address is 128 bits long, which has 2^128 address space.

24) Consider the following:

1. Twisted pair cables
2. Microwaves and Satellite Signals
3. Repeaters
4. Analog Transmissions
5. Fiber optics

Which of the above is consider as (a) signal transmission medium is data communications?

a. (1) and (5)

b. (1) and (2)

c. (1) (2) and (5)

d. (1) (2) (3) and (5)

Answer: (c) (1) (2) and (5)

25) Which of the following is correct IPv4 address?

a. 124.201.3.1.52

b. 01.200.128.123

c. 300.142.210.64

d. 10110011.32.16.8

e. 128.64.0.0

Answer: (e) 128.64.0.0

Explanation: 128.64.0.0 is correct IPv4 address because IPv4 is a standard numbering system that uses four integers from 0 to 255. The IP address is a group of numbers that identify user system on the network.

26) The term WAN stands for?

a. Wide Area Net

b. Wide Access Network

c. Wide Area Network

d. Wide Access Net

Answer: (c) Wide Area Network

Explanation: The term WAN stands for Wide Area Network.

27) Which of the following cannot be used as a medium for 802.3 ethernet?

a. A thin coaxial cable

b. A twisted pair cable

c. A microwave link

d. A fiber optical cable

Answer: (c) A microwave link

Explanation: A microwave link cannot be used as a medium for 802.3 ethernets, because a microwave link is a transmission network that utilizes a beam of radio waves in the microwave frequency spectrum to relay video, audio, or data between two places.

28) What IP address class allocates 8 bits for the host identification part?

a. Class A

b. Class B

c. Class C

d. Class D

Answer: (c) Class C

Explanation: In class C only, 8 bits are reserved for the host ID, and 24 bits are reserved for network ID.

29) How many versions available of IP?

a. 6 version

b. 4 version

c. 2 version

d. 1 version

Answer: (c) 2 version

Explanation: There are only two IP versions are avilable in the present: IP version 4 (IPv4) and IP version 6 (IPv6).

30) Which layer of the TCP / IP stack corresponds to the OSI model transport layer?

a. Host to host

b. Application

c. Internet

d. Network Access

Answer: (a) Host to Host

Explanation: The host to host layer conforms the transport layer of the OSI model. This layer is responsible for the final correspondence and error-free distribution of data.

31) On a simplex data link, which of the following is a possible error recovery technique?

a. Backward error correction (BEC)

b. The use of hamming codes

c. Automatic Repeat Request (ARQ)

d. Downward error correction (DEC)

Answer: (b) The use of hamming codes

Explanation: The hamming codes is an error recovery technique that can be used to detect and correct the errors. It was developed by R.W. Hamming.

32) Which of the statement is correct with regard to Time Division Multiplexing (TDM) and its variants?

a. Statistical TDM makes efficient use of the bandwidth only if the arrival pattern of the data stream is probabilistic.
b. TDM requires the transmitter and receiver to be synchronized periodically.
c. TDM performs efficiently if the arrival pattern of the data stream is probabilistic.
d. Statistical TDM is efficient if the data stream is deterministic.

Answer: (a) and (b)

33) The term IPv4 stands for?

a. Internet Protocol Version 4

b. Internet Programming Version 4

c. International Programming Version 4

d. None of these

Answer: (a) Internet Protocol Version 4

Explanation: The term IPv4 stands for Internet Protocol Version 4.

34) The term LAN stands for?

a. Local Area Net

b. Local Aera Network

c. Local Array Network

d. Local Array Net

nswer: (b) Local Area Network

Explanation: The term LAN stands for Local Area Network.

35) Which of the through is share the data of two computer?

a. Library

b. Network

c. Grouping

d. Integrated system

Answer: (b) Network

Explanation: There are many ways to share data between two computers, but a network connection is established before data sharing.

36) In specific, if the systems use separate protocols, which one of the following devices is used to link two systems?

a. Repeater

b. Gateway

c. Bridge

d. Hub

Answer: (b) Gateway

Explanation: If the system used separate protocols, gateway device is used to link two systems.

37) Which of the following statement is true about error detection techniques used on communications link?

a. Cyclic Redundancy Check (CRC) sequence can detect as well as correct errors.

b. Error detection cannot be used on simplex links.

c. Hamming code can detect up to 3-bit errors.

d. All of the these

Answer: (d) All of the these

Explanation: None

38) The correct order of corresponding OSI layers for having functionalities of routing and reconciling machine representation differences with shared access resolution and ASCII test protocol is?

a. Network, Physical, Transport, Data link

b. Network, Physical, Data link, Application

c. Network, Presentation, Data link, Application

d. Network, Presentation, Physical, Transport

Answer: (c) Network, Presentation, Data link, Application

MCQ's based on the Basics of Cloud Computing

1) What type of computing technology refers to services and applications that typically run on a distributed network through virtualized resources?

a. Distributed Computing

b. Cloud Computing

c. Soft Computing

d. Parallel Computing

Answer: B

Explanation: Cloud computing is a computing technique in which applications are accessed by common internet protocols and networking standards.

2) Which one of the following options can be considered as the Cloud?

a. Hadoop

b. Intranet

c. Web Applications

d. All of the mentioned

Answer: A

Explanation: Whenever any intranet becomes large enough in size that a diagram is not able to differentiate the individual physical system, so at that stage intranet also becomes known as a cloud. Hadoop can be considered as a cloud.

3) Cloud computing is a kind of abstraction which is based on the notion of combining physical resources and represents them as _______resources to users.

a. Real

b. Cloud

c. Virtual

d. none of the mentioned

Answer: C

Explanation: Cloud Computing is a kind of new model for providing resources for applications such as staging applications, platform-independent user access to services.

4) Which of the following has many features of that is now known as cloud computing?

a. Web Service

b. Software

c. All of the mentioned

d. Internet

Answer: D

Explanation: Internet provides the abstraction, runs through the same set of protocols and standards, and uses the same operating system and applications.

5) Which one of the following cloud concepts is related to sharing and pooling the resources?

a. Polymorphism

b. Virtualization

c. Abstraction

d. None of the mentioned

Answer: B

Explanation: The application runs on physical systems that are not specified in real. The information stored in the locations that are also not specified or unknown, administration of the systems are outsourced to others and can be accessed by the user.

6) Which one of the following statements is not true?

a. The popularization of the Internet actually enabled most cloud computing systems.

b. Cloud computing makes the long-held dream of utility as a payment possible for you, with an infinitely scalable, universally available system, pay what you use.

c. Soft computing addresses a real paradigm in the way in which the system is deployed.

d. All of the mentioned

Answer: C

Explanation: Cloud computing is distinguished by the notion that resources are virtual and infinite and describe the physical systems on which software runs in the abstracted manner from the user.

7) Which one of the following can be considered as a utility is a dream that dates from the beginning of the computing industry itself?

a. Computing

b. Model

c. Software

d. All of the mentioned

Answer: A

Explanation: Cloud computing takes the technology, services, and applications that are similar to those on the Internet and turns them into a self-service utility.

8) Which of the following is an essential concept related to Cloud?

a. Reliability

b. Abstraction

c. Productivity

d. All of the mentioned

Answer: B

Explanation: Cloud computing hides all the detail of system implementation from users and developers.

9) Which one of the following is Cloud Platform by Amazon?

a. Azure

b. AWS

c. Cloudera

d. All of the mentioned

Answer: B

Explanation: Amazon web service is one of the most successful cloud-based businesses, which offers infrastructure as a service and lets you rent virtual computers on its own infrastructure.

10) Which of the following statement is not true?

a. Through cloud computing, one can begin with very small and become big in a rapid manner.

b. All applications benefit from deployment in the Cloud.

c. Cloud computing is revolutionary, even though the technology it is built on is evolutionary.

d. None of the mentioned

Answer: B

Explanation: A variety of issues, such as issues with latency, security, and regulatory compliance, all are subject to concern. AWS is one of the most successful cloud-based businesses, which is a type of infrastructure as a service and lets you rent virtual computers on its own infrastructure.

Cloud Computing Architecture.

1) Cloud computing architecture is a combination of?

a. service-oriented architecture and grid computing

b. Utility computing and event-driven architecture.

c. Service-oriented architecture and event-driven architecture.

d. Virtualization and event-driven architecture.

Answer: C

Explanation: Cloud computing architecture is a combination of service-oriented architecture and event-driven architecture.

2) In how many parts we can broadly divide the architecture of the Cloud?

a. 4

b. 3

c. 2

d. 5

Answer: C

Explanation: The architecture of the Cloud can broadly be divided into two main parts that are Back-end and Front-end.

3) Which one of the following refers to the user's part of the Cloud Computing system?

a. back End

b. Management

c. Infrastructure

d. Front End

Answer: D

Explanation: It is the front-end that refers to the user's part of the cloud computing system. It includes many applications and interfaces that are required to access or use the cloud computing platform.

4) Which one of the following can be considered as the example of the Front-end?

a. Web Browser

b. Google Compute Engine

c. Cisco Metapod

d. Amazon Web Services

Answer: A

Explanation: From the following given options, we can consider the Web-browser as the perfect example of the Front-end.

25) By whom is the backend commonly used?

a. Client

b. User

c. Stockholders

d. service provider

Answer: D

Explanation: It is commonly used by the service provider in order to manage all resources required to provide the Cloud Computing Services.

6) Through which, the backend and front-end are connected with each other?

a. Browser

b. Database

c. Network

d. Both A and B

Answer: C

Explanation: Typically using an internet connection, both the front and back end are connected to the others through a network.

7) How many types of services are there those are offered by the Cloud Computing to the users?

a. 2

b. 4

c. 3

d. 5

Answer: C

Explanation: Usually, Cloud Computing offers three types of services to the users that are Platform as a service (or PaaS), Application as a service (or AaaS), and Software as a service (or SaaS).

8) The Foce.com and windows Azure are examples of which of the following?

a. IaaS

b. PaaS

c. SaaS

d. Both A and B

Answer: B

Explanation: Both Force.com and Windows Azure are examples of the Platform as a service

9) Which of the following is one of the backend's built-in components of cloud computing?

a. Security

b. Application

c. Storage

d. Service

Answer: A

Explanation: Security is one of the back-end's built-in components of cloud computing.

10) Which of the following provides the Graphic User Interface (GUI) for interaction with the cloud?

a. Client

b. Client Infrastructure

c. Application

d. Server

Answer: B

Explanation: The Client Infrastructure is one of the front-end components that provide the way of communication in the form of a Graphic User Interface to communicate with the Cloud.

MCQ's based on the SaaS

1) Which of the following is the correct full form of SaaS?

a. Storage-as-a-Service

b. Server-as-a-Software

c. Software-as-a-Service

d. None of the above

Answer: C

Explanation: The term "SaaS" stands for the "Software as a Service," a type of model that allows to offer Software application as a service for the customers. For Example: MailChimp, Google Apps, Dropbox, Salesforce, etc

2) Through which one of the following models, SaaS supports multiple users and offers a shared data model?

a. single-tenancy

b. multiple-instance

c. multi-tenancy

d. None of the above

Answer: C

Explanation: There is also an alternate of the Software virtualization of the single individual instances that exist, although it is not that common.

3) Which of the following is the SaaS's Characteristics?

a. Usually, the license is subscription-based or usage-based and is billed on a recurring basis.

b. The software and the service are observed and maintained usually by the vendor.

c. Software mostly available over the internet across the world and can be provided according to the demand through the browser.

d. All of the above

Answer: D

Explanation: Sometimes it may be the client-side executable code. Still, it is not the end-user's responsibility to maintain that code and maintain its interaction with the services at all.

4) Which of the following is a characteristic of the SaaS applications?

a. SaaS applications are reliable

b. SaaS applications are not customizable

c. SaaS applications are customizable

d. Non-reliable

Answer: C

Explanation: SaaS offers Application Programming Interface (API) to the users, which allows the users/developers to develop a customized application.

5) Which types of issues are associated with the SaaS?

a. Modest software tools

b. Multitenant solutions

c. Centralized management and data

d. Network dependence

Answer: D

Explanation: There are many issues associated with the SaaS (Software as a Service), such as Lack of portability between SaaS clouds, Web-browser related issues, and Network dependence.

6) Which one of the following statements can be considered as the true characteristics of software as a Service (SaaS) model?

a. Software applications are generally maintained by the service provider (or vendor)

b. SaaS provides the best cost-effective applications because they do not need any maintenance at the customer side.

c. They can easily scale up or scale down according to the conditions.

d. All of the above

Answer: D

Explanation: All the statements provided in the above question are the characteristics of the SaaS or Software as a Service model.

7) Which one of the following is not the correct statement?

a. SaaS may be also be described as software deployed on a hosted service.

b. The platform can be based on the types of software development languages, frameworks, and several other constructs.

c. SaaS is the cloud-based equivalent of shrink-wrapped software

d. All of the above

Answer: D

Explanation: SaaS can be accessed globally through the internet, usually in a browser.

8) Which one of the following can be considered as the most complete cloud computing service model?

a. PaaS

b. IaaS

c. CaaS

d. SaaS

Answer: D

Explanation: The most complete cloud computing service model must contain the computing hardware and software, as well as the solution itself. Hence the SaaS model has all these features.

9) In SaaS, the used open-source software are also known as_____

a. Closed

b. Free

c. Open

d. all of the mentioned

Answer: C

Explanation: In general, a huge part of the SaaS Software's is based on the open-sourced software.

10) Which one of the following statements is not true about SaaS?

a. SaaS applications are offered in all shapes and sizes.

b. All users with a little knowledge or know how to operate a computer also know about the SaaS.

c. SaaS software is not customizable.

d. None of the above

Answer: D

Explanation: Every computer user is well familiar with SaaS, which is an alternate for the locally installed software.

MCQ's based on the PaaS (Platform as a service)

1) Which type of PaaS does not contains any type of license or technical dependencies on specific SaaS applications?

a. Add-on development facilities

b. Application delivery-only environments

c. Open Platform as a service

d. Stand-alone development environments

Answer: D

Explanation: The PaaS is a type of stand-alone, works as the independent entity for the unique function. It also does not require technical dependencies and licensing on any special SaaS (Software as a service) applications.

2) Which one of the following is associated heavily with vendor lock-in?

a. DaaS

b. SaaS

c. IaaS

d. PaaS

Answer: D

Explanation: The main problem with the "Platform as a service" (or PaaS) is that it normally tie the developer and the customer in such a solution, in which both the developer and customers have to depend on the platform vendor.

3) Which one of the following is a type of PaaS that usually allows customizing the existing SaaS platform?

a. Stand-alone development environments

b. Add-on development facilities

c. Open Platform as a service

d. Application delivery-only environments

Answer: B

Explanation: Add-on development facilities are a type of Paas that allows us to customize the existing SaaS platform.

4) Which one of the following of PaaS type that involves on-demand scaling and application security?

a. Stand-alone development environments

b. Open Platform as a service

c. Application delivery-only environments

d. Add-on development facilities

Answer: C

Explanation: The application delivery-only environment contains features like application security and on-demand scaling.

5) How many types of PaaS are there?

a. 4

b. 3

c. 2

d. 5

Answer: A

Explanation: On the basis of function, there are four types of PaaS.

6) Which one of the following can be considered as the benefit of PaaS?

a. Lower administrative overhead

b. Lower total cost of ownership

c. More current system software

d. All of the above

Answer: D

Explanation: Lower administrative overhead, the lower total cost of ownership and more current network all are the benefits of the PaaS (Platform as a service).

7) In AWS, which of the following is the AWS Management Console?

a. CAS

b. CDSS

c. CCS

d. CDA

Answer: C

Explanation: CSS is the AWS Management Console in the AWS.

8) Which of the following can be considered PaaS offering?

a. Youtube

b. Google Earth

c. Google Adsense

d. Google Maps

Answer: D

Explanation: In most cases, vendors of PaaS solutions are the developer who provides a complete solution to the customer.

9) Which one of the following is not the correct statement?

a. The customer assumes no responsibility for maintaining the hardware, software or the development of applications.

b. Google's App Engine platform is one of the IaaS offerings.

c. The vendor is usually responsible for all operational aspects of the services.

d. All of the above

Answer: B

Explanation: The customer is generally responsible only for his interaction with the Platform.

10) Which one of the following statements is correct about the PaaS?

a. The platform as a service (or PaaS) systems usually support standards like JavaScript, HTML, and several other rich media technologies.

b. Platform as a service provides the runtime environment for the applications.

c. The platform as a service is a completely integrated development environment.

d. All of the above

Answer: D

Explanation: All statements mentioned in the above questions are true about the PaaS, so that the correct option will be the D.

MCQ's based on the IaaS

1) The terms "Iaas" stand for?

a. IT-as-a-Service

b. Infrastructure-as-a-Service

c. Internet-as-a-Service

d. Interoperability-as-a-Service

Answer: B

Explanation: The full form of the term IaaS is "Infrastructure as a Service."

2) The resources like IP addresses and VLANs are provided to the end-users by which of the following?

a. Server virtualization.

b. Client virtualization.

c. End-user virtualization.

d. IaaS

Answer: A

Explanation: Resources such as the IP addresses and VLANs are offered to the end-users through the server virtualization.

3) Which one of the following is a kind of open standard protocol?

a. SOAP

b. WSDL

c. DHML

d. SIMPLE

Answer: D

Explanation: The term "SIMPLE" is a type of open standard protocol.

4) In the virtual appliance, the content can be ______.

a. structured

b. unstructured

c. Both A and B

d. None of the above

Answer: C

Explanation: In a virtual appliance, the content can be either structured or unstructured.

5) How many kinds of virtual private server instances are there partitioned in the IaaS stack?

a. 3

b. 2

c. 4

d. 5

Answer: A

Explanation: There are only three types of workloads that need three different sizes of computers, such as large, medium, and small.

6) Which of the following forms the basis for almost all web services stacks?

a. WSDL

b. SOAP

c. UDDI

d. VMCC. SOA

Answer: B

Explanation: The term "SOAP" stands for the Simple Object Access Protocol, and it forms the basis for most Web Service Stacks.

7) Which of the following is the most commonly used model for description and discovery and is also used with SOAP messaging?

a. DHML

b. VMC

c. WSDL

d. SOA

Answer: C

Explanation: Web Services Description Language (WSDL) is the model that is usually used for description and discovery, and it is also used with SOAP messaging.

8) The Infrastructure as a service (IaaS) provides a type of isolated environment to each customer individually by using_____.

a. renting

b. virtual machine sprawl

c. security vulnerabilities

d. hypervisor

Answer: D

Explanation: The Infrastructure as a service (or IaaS) provides a type of isolated environment to each customer individually through the hypervisors.

9) IaaS usually shares issues with the ______.

a. PaaS

b. SaaS

c. Both A and B

d. None of the above

Answer: C

Explanation: It usually shares issues with both PaaS (Platform as a service) and SaaS (Software as a service)

10) Which of the following is an advantage of IaaS (Infrastructure as service)?

a. Efficient and flexible renting of computer hardware.

b. Portability, interoperability with legacy applications.

c. Complete control of the computing resources through administrative access to VMs.

d. All of the above

Answer: D

Explanation: All statements mentioned in the above questions are the advantages of the IaaS (Infrastructure as a service)

Advantages and Disadvantages of Cloud Computing

1) Which one of the following was one of the top 5 cloud applications in late 2010?

a. Cloud backup

b. Web applications

c. Business applications

d. All of the mentioned

Answer: D

Explanation: The economics of software delivery has been shifted in a significant manner, just like the music downloads has been shifted the delivery of the music.

2) Which one of the following statements is not true?

a. Google's cloud involves approx ten data-centers in all over the world.

b. Data centers are sited in such a way that the overall system latency can be optimized.

c. The online shopping website, such as Flipkart.com, has the infrastructure built so that it can support the elastic demand so the system will be capable of accommodating peak traffic.

d. All of the above

Answer: B

Explanation: Data-centers can help lower land costs and reduce occupations.

3) Which of the following benefits is related to creating stored resources together in a system that supports multi-tenant use?

a. On-demand self-service

b. Extensive network access

c. Resource pooling

d. All of the above

Answer: A

Explanation: The cloud service provider creates resources that support multi-tenant usage in a system.

4) Which one of the following is something that a user can obtain it under the contract from his/her vendor?

a. PoS

b. SoS

c. QoS

d. All of the mentioned

Answer: C

Explanation: Usually, it totally depends on the type of services being offered. One can find that he/she does not require any software or hardware licensees in order to implement his/her services.

5) All cloud computing applications suffer from the inherent ________ that is intrinsic in their WAN connectivity.

a. Propagation

b. Latency

c. Noise

d. All of the mentioned

Answer: B

Explanation: While cloud computing applications excel at large-scale processing tasks, if your application needs large amounts of data transfer, cloud computing may not be the best model for you.

6) Which of the following architectural standards is working with the cloud computing industry?

a. Service-oriented architecture

b. Standardized Web services

c. Web-application frameworks

d. All of the mentioned

Answer: A

Explanation: These standards help to enable different business models that cloud computing vendors can support, most notably Software as a Service (SaaS), Web 2.0 applications, and utility computing. When your data travels over and rests on systems that are no longer under your control, you have increased risk due to others' interception and malfeasance.

7) Which one of the following is the most important subject of concern in cloud computing?

a. Security

b. Storage

c. Scalability

d. All of the mentioned

Answer: A

Explanation: When your data travels over and rests on systems that are no longer under your control, you have increased risk due to others' interception and malfeasance.

8) You cannot rely on a cloud provider for maintaining its _____ in the event of government work.

a. Scalability

b. Reliability

c. Privacy

d. None of the mentioned

Answer: C

Explanation: The Cloud computing industry continues to address security concerns.

9) _______ enables batch processing, which greatly speeds up high-processing applications.

a. Scalability

b. Reliability

c. Elasticity

d. Utility

Answer: A

Explanation: This feature obviates the need for planning and provisioning.

10) _______ feature allows you to optimize your system and capture all possible transactions.

a. Scalability

b. Reliability

c. Elasticity

d. none of the mentioned

Answer: C

Explanation: You have the ability to right-size resources as required.

11) _______ is a pay-as-you-go model matches resources to need on an ongoing basis.

a. Utility

b. Elasticity

c. Low barrier to entry

d. All of the mentioned

Answer: A

Explanation: This eliminates waste and has the added benefit of shifting risk from the client.

12) Which of the following is the most refined and restrictive service model?

a. IaaS

b. CaaS

c. PaaS

d. All of the mentioned

Answer: C

Explanation: When the service requires the client to use a complete hardware/software/application stack, it is used the most refined and restrictive service model.

13) When you add a software stack, such as an operating system and applications to the service, the model shifts to _____ model.

a. SaaS

b. PaaS

c. IaaS

d. All of the mentioned

Answer: A

Explanation: Microsoft's Windows Azure Platform is best described as currently using the SaaS model.

14) Which one of the following is a false statement?

a. A cloud is defined as the combination of the infrastructure of a data-center with the ability to provision hardware and software.

b. High touch applications are best done on-premises.

c. The Google App Engine follows IaaS.

d. None of the mentioned

Answer: C

Explanation: The Google App Engine follows PaaS (or Platform as a service).

15) Service that generally focuses on the hardware follows which one of the following service models?

a. IaaS

b. CaaS

c. PaaS

d. All of the mentioned

Answer: A

Explanation: Amazon web service follows the PaaS model.

16) Which of the following types of applications works with cloud computing that has low risks, low margins?

a. High touch

b. Low touch

c. Moderate touch

d. All of the mentioned

Answer: B

Explanation: The "low touch" applications that come with low margins require committed resources and pose less risk.

17) Which one of the following statements is false?

a. Service Level Agreements (SLAs) is a small aspect of cloud computing.

b. Cloud computing does not have an impact on Software licensing.

c. Cloud computing present new opportunities to users and developers.

d. All of the mentioned

Answer: C

Explanation: The answer will be the C because it is based on the paradigm of a shared multi-tenant utility.

18) Which one of the following is a special attribute of cloud computing?

a. utility type of delivery

b. elasticity

c. low barrier to entry

d. all of the mentioned

Answer: C

Explanation: These attributes change how applications are created, priced, and delivered.

UNIT 4

Digital Electronics and Introduction to IC Technology

1. **Which number system has a base 16**

    a. Hexadecimal
    b. Octal
    c. Binary
    d. Decimal

Answer: a

Explanation: Hexadecimal is a number system with a base 16. We can divide the word HEXA+DECIMAL for better understanding; it means 6 and 10 make 16. It is the easiest way to write and count numbers represented in terms of base 16. There are sixteen distinct digits in the hexadecimal system, it starts from 0, 1,2,3,4,5,6,7,8,9, A, B, C, D, E and end to F. Where A= 10, B=11, C=12, D=13, E=14, F=15. It is usually represented by 4 bits in binary number system by 8421 code.

2. **The following hexadecimal number (1E.43)16 is equivalent to**

a. $(36.506)_8$
b. $(36.206)_8$
c. $(35.506)_8$
d. $(35.206)_8$

Answer: b

Explanation:

If you want to convert a hexadecimal number into an octal number, the first thing you need to do is convert a hexadecimal number into binary form by writing the binary equivalent of each digit in the form of 4 bits. Once you write the number into binary form, you need to group the binary equivalent in 3 bits, then for each of the three bits, the respective digit is written.

$(1E.43)_{16} = (0001\ 1110.0100\ 0011)_2$

$= (00011110.01000011)_2$

$= (011110.010000110)_2$

$= (011\ 110.010\ 000\ 110)_2$

$= (36.206)_8$

3. **How many entries will be in the truth table of a 4-input NAND gate**

a. 6

b. 8
c. 32
d. 16

Answer: d

Explanation:

A NAND gate is a universal logic gate that performs the negation (NOT) of an AND logic operations in digital circuits.

As we know,

$Y = 2^n$ Y number of Entries in the truth table

Where,   n = number of inputs.

4. How many bits are needed to store one BCD digit?

a. 2 bits
b. 4 bits
c. 3 bits
d. 1 bit

Answer: b

Explanation: BCD stands for Binary Coded Decimal. It is a type of binary encoding where each decimal digit is represented by a fixed number of bits, usually 4. It is also called 8421 code to represent the maximum number 15. BCD can encode only from 0-9. For example, Decimal number 456, its equivalent BCD code is 0100 0101 0110

5. Convert $(312)_8$ into decimal

a. $(201)_{10}$
b. $(202)_{10}$
c. $(203)_{10}$
d. $(204)_{10}$

Answer: b

Explanation:

Octal to decimal conversion is usually obtained by multiplying 8 to the power of base along with the value at the index position.

$(312)_8 = 3 * 8^2 + 1* 8^1 + 2* 8^0$

$= 192 + 8 +2 = (202)_{10}$

6. Which of these sets of logic gates are known as universal gates?

a. XOR, NAND, OR
b. OR, NOT, XOR
c. NOR, NAND, XNOR
d. NOR, NAND

Answer: d

Explanation: NAND or NOR gates are used to design all other logic gates, so; they are termed universal gates.

7. What is the addition of the binary number 101001+ 010011=?

a. 010100
b. 111100
c. 000111
d. 101110

Answer: b

Explanation: If you want to add any binary number, first, you need to know the binary addition rules.

0 + 1 = 1

1 + 0 = 1

0 + 0 = 0

1 + 1 = 0 (with carry 1)

101001+ 010011 = 111100

8. What is the binary subtraction of 101001 - 010110 =?

a. 010011
b. 100110
c. 011001
d. 010010

Answer: a

Explanation: If you want to subtract any binary number, first, you need to know the binary subtraction rules.

1 - 0 = 1

0 - 1 = 1 (With borrow 1)

0 - 0 = 0

1 - 1 = 0

therefore, the subtraction of 101001 - 010110 = 010011

9. **What is the binary multiplication of 10100 * 01011 =?**

a. 011011000
b. 011001100
c. 011011100
d. 011100011

Answer: c

Explanation: If you want to multiply any binary number, you need to know the binary multiplication rules.

1 * 0 = 0

0 * 1 = 0

0 * 0 = 0

1 * 1 = 1

therefore, the multiplication of 10100 - 01011 = 011011100

10. **Divide the binary number: 111001 ÷ 1101 and find the reminder**

a. 1010
b. 0110
c. 0101
d. 0011

Answer: c

Explanation:

If you want to divide any binary number, you need to know the binary division rule. The binary division is accomplished using the long division rule.

Therefore, the remainder of 111001 ÷ 1101 = 0101

11. A classification of integrated circuits with complexities of 30 to 300 equivalent gates on a single chip is known as?

a. VLSI

b. SSI

c. LSI

d. MSI

Answer: d

Explanation: The terminologies like MSI, SSI, LSI and VLSI came out from the complexity of the integrated circuit. It means the total number of transistors are fabricated on a single chip. Jack Kilby invented the first integrated circuit in 1959, so, after that, the Integrated circuit has emerged like SSI, LSI, MSI and VLSI.

In **MSI** (Medium Scale Integration) = **30 - 300** gates /chip (counters, multiplexers, registers)

In **LSI** (Large Scale Integration) = **300 - 3000** gates /chip (8-bit processors)

In SSI (Small-Scale Integration) = **3 - 30** gates /chip (logic gates, flip flops)

In VLSI (Very Large-Scale Integration) = **>3000** gates / chip (16 bit and 32- bit processors)

12. 1's complement of 1011001 is

a. 0100111

b. 0101100

c. 0100110

d. 0110110

Answer: c

Explanation:

If you want to calculate 1's complement of any binary number, you need to reverse its binary bits. All the 0's to 1's and 1's to 0's.

Therefore, 1's complement of 1011001 = 0100110

13. 2's complement of 1011011 is

a. 0100011
b. 0110101
c. 0100011
d. 0100101

Answer: d

Explanation: If you want to calculate 2's complement of any binary number, first you need to calculate 1's complement of that number and then add 1 to it.

2's complement of 1011011 = 0100100 + 1 = 0100101.

14. A digital circuit that can store only one bit is a

a. Register
b. NOR gate
c. Flip-flop
d. XOR gate

Answer: c

Explanation: A flip-flop refers to an electronic circuit with two stable states that can be used to store the binary data (1,0). Flip-flop can store only one bit of data, either a logic 1 or 0. This logic state can be represented as the voltage on the flip-flop's output because it can be controlled to hold the logic state, effectively a 1 -bit memory.

15. In Digital electronics (Boolean algebra), the OR operation is performed by which of the given properties

a. Distributive properties
b. Commutative properties
c. Associative properties
d. All of these

Answer: d

Explanation:

In Boolean algebra, the distributive properties are given by the following equation:

A + BC = (A+B) (A+C) & A(B+C) = AB+AC

In Boolean algebra, the commutative properties are given by the following equation:

A+B = B+A & A*B = B*A

In Boolean algebra, the distributive properties are given by the following equation:

A+(B+C) = (A+B) +C & A*(B*C) = (A*B) *C

16. De-Morgan's Law states that

a. (A+B)' = A'*B
b. (AB)' = A' + B'
c. (AB)' = A' + B
d. (AB)' = A + B

Answer: b

Explanation: DeMorgan's theorems play a vital role in digital electronics. It gives an equivalency between the logic gates. There are two distinct types of DeMorgan's theorems: the first gives the equivalent of the NAND gate, and the other gives the equivalent of the NOR gate. As per the dual property of DeMorgan's theorem (AB)' = A' + B' & (A+B) = A' * B'

17. The logical sum of two or more than two logical products is termed as

a. OR operation
b. POS
c. SOP
d. NAND operation

Answer: c

Explanation: SOP stands for "Sum of products." SOP is a way that a Boolean Algebra formula can be written. For example, the sum of product formula: AB + A'B'. In other words, it is defined as the logical sum of two or more logical product terms. POS refers to the logical product of two or more than two logical sum terms.

18. The Minterms for four variables

a. 8
b. 16
c. 2
d. 1

Answer: b

Explanation:

Minterms is given by the following formula

Minterm = 2^n

Therefore, 2^4= 16 minterms are needed.

19. **A K-map (Karnaugh map) is an abstract form of which diagram organized as a squares matrix.**

    a. Block diagram
    b. Cycle diagram
    c. Square diagram
    d. Venn diagram

Answer: d

Explanation: K- Map, also known as Karnaugh map, refers to a pictorial representation of a truth table. It helps in minimizing variables of any Boolean expression. It is also an abstract form of a Venn diagram arranged as a square of a matrix, where each square represents a minterm or maxterm.

20. **One nibble is equal to how many bits**

    a. 4
    b. 2
    c. 16
    d. 8

Answer: a

Explanation: In digital electronics, the smallest unit of storage consisting of either 0 or 1 is called a bit. The arrangement of such 4 bits is known as a nibble. The arrangement of such 8 bits is known as a byte.

21. **Suppose the output of an XNOR gate is 1. Which of the given input combination is correct?**

    a. A = 0, B' = 1
    b. A = 1, B = 1
    c. A = 0, B = 1
    d. A = 0, B = 0

Answer: d

Explanation:

An XNOR refers to a digital logic gate with two or more inputs and one output that executes logical equality. The output of an XNOR gate is true either all of its inputs are true, or all of its inputs are false. When one of its inputs is false, and others are true, then the output is false. The output of the XNOR gate is given by the following equation.

AB + A'B,' For **A = 0** AND **B = 0** the output will be 1.

22. The AND operation is equivalent to

a. Union
b. Intersection
c. Division
d. Both option a and b

Answer: b

Explanation: AND operation is equivalent to Intersection. It means Y = A.B i.e. A AND B = A Intersection B. The output is 1, if and only if all the given inputs are 1.

23. Positive integers must be represented by

a. Signed numbers
b. Unsigned numbers
c. Both option a and b
d. None of the above

Answer: b

Explanation: The negative integers are represented by signed numbers on the extreme left side, whereas the positive integers are represented using unsigned numbers.

24. What is the radix of the octal number system?

a. 2
b. 10
c. 8
d. 16

Answer: c

Explanation: A radix of a number system refers to the number of base digits, including zero, that are used to represent large values. In the binary number system, that would be 2 (0,1). In the octal number system, that would be 8 (0 to 7). In the decimal number system, that would be 10 (0 to 9). In the hexadecimal number system, that would be 16 (0 to 15).

25. Which integrated circuit is having more that 100 gates?

a. Small-scale integration (SSI)
b. Medium-scale integration (MSI)
c. Large-scale integration (LSI)
d. Very large-scale integration (VLSI)

Answer: **Option C**

26. Which integrated circuit is having 10 to 100 gates?

a. Small-scale integration (SSI)
b. Medium-scale integration (MSI)
c. Large-scale integration (LSI)
d. Very large-scale integration (VLSI)

Answer: **Option B**

27. Integrated circuits having up to 9 gates is called

a. Small-scale integration (SSI)
b. Medium-scale integration (MSI)
c. Large-scale integration (LSI)
d. Very large-scale integration (VLSI)

Answer: **Option A**

28. Small Scale Integration(SSI) refers to ICs with __________ gates on the same chip.

a. Fewer than 10
b. Greater than 10
c. Equal to 10
d. Greater than 50

Answer: a

Explanation: Small Scale Integration(SSI) refers to ICs with fewer than 10 gates on the same chip.

29. MSI means ___________

a) Merged Scale Integration
b) Main Scale Integration
c) Medium Scale Integration
d) Main Set Integration
View Answer

Answer: c
Explanation: MSI means Medium Scale Integration.

30. MSI includes _______ gates per chip.

a) 12 to 100
b) 13 to 50
c) greater than 10
d) greater than 100

Answer: a
Explanation: Medium Scale Integration includes 12 to 100 gates per chip.

31. LSI means ________ and refers to ________ gates per chip.
a) Long Scale Integration, more than 10 upto 10000
b) Large Scale Integration, more than 100 upto 5000
c) Large Short Integration, less than 10 and greater than 5000
d) Long Short Integration, more than 10 upto 10000

Answer: b
Explanation: The full form of LSI is Large Scale Integration and refers to more than 100 upto 5000 gates per chip.

32. How many gates per chip are used in first generation Integrated Circuits?
a) 3-30
b) 30-300
c) 300-3000
d) More than 3000

Answer: a
Explanation: The first generation ICs belongs to small scale integration, which consists of 3-30 gates per chip (approximately).

33. Find the chip area for a Medium Scale Integration IC?
a) 8 mm^3
b) 4 mm^2
c) 64 mm^3
d) 16 mm^2

Answer: d
Explanation: The approximate length and breadth of Medium Scale Integration would be 4 mm. Therefore, its area is given as = length × breadth = 4mm × 4mm = $16mm^{2.}$

34. The number of transistors used in Very Large Scale Integration is
a) 10^7 transistors/chip
b) $10^6 – 10^7$ transistors/chip
c) $20^3 – 10^5$ transistors/chip
d) $10^2 – 20^3$ transistors/chip

Answer: c
Explanation: Very Large Scale Integration (VLSI) ICs are fabricated using more than 3000 gates/chip, which is equivalent to 20,000 – 1,00,00,00 transistors/chip.

35. Determine the chip area for Large Scale Integration ICs.

a) 1,00,000 mil^2
b) 10,000 mil^2
c) 1,60,000 mil^2
d) 16,000 mil^2

Answer: c
Explanation: The chip area for a Large Scale Integration IC is 1 cm^2.
=> Area of LSI = 10mm × 10mm = 1cm × 1 cm = $1cm^2$.
=> 1,60,000mil^2 (1cm=400mil).

36. The concept of Integrated circuits was introduced at the beginning of 1960 by

a) Texas instrument and Fairchild Semiconductor
b) Bell telephone laboratories and Fair child Semiconductor
c) Fairchild Semiconductor
d) Texas instrument and Bell telephone Laboratories

Answer: a
Explanation: The concept of Integrated circuits was introduced by Texas instrument and Fairchild Semiconductor, whereas Bell telephone laboratories developed the concept of transistors.

37. There are ______ cells in a 4-variable K-map.

a) 12
b) 16
c) 18
d) 8

Answer: b
Explanation: There are 16 = (2^4) cells in a 4-variable K-map.

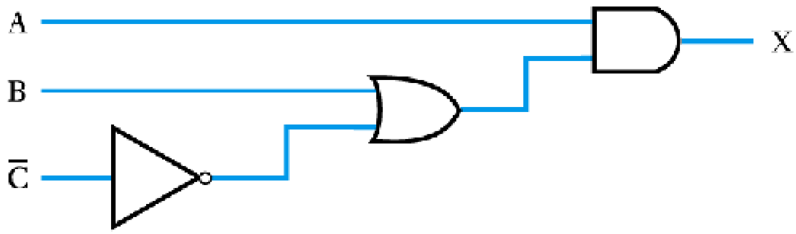
38. Don't care conditions can be used for simplifying Boolean expressions in ____________

a) Registers
b) Terms
c) K-maps
d) Latches

Answer: c

Explanation: Don't care conditions can be used for simplifying Boolean expressions in K-maps which helps in pairing with 1/0.

39. What Boolean expression describes the output X of this arrangement?



X = A + B + C
X = A.(B + C)
X = A + (B.C)
X = (A.B) + C

40. Find the simplified expression A'BC'+AC'.

a) B
b) A+C
c) (A+B)C'
d) B'C

Answer: c
Explanation: Given: A'BC' + AC'
= C'(A'B + A)
= C'(A + B).

41. Evaluate the expression: (X + Z)(X + XZ') + XY + Y.

a) XY+Z'
b) Y+XZ'+Y'Z
c) X'Z+Y
d) X+Y

Answer: d
Explanation: (X + Z)(X + XZ') + XY + Y [Original Expression]
= (x + z)X(1 + Z') + XY + Y [Distributive]
= (X + Z)X + XY + Y [Complement, Identity]
= (X+Z)X + Y(X+1) [Distributive]
= (X+Z)X + Y [Idempotent]
= XX + XZ + Y [Distributive]
= X + XZ + Y [Identity]
= X(1+Z) + Y
= X + Y [Idempotent].

42. Simplify the expression: A'(A + BC) + (AC + B'C).

a) (AB'C+BC')
b) (A'B+C')
c) (A+ BC)
d) AC

Answer: b
Explanation: Given: A'(A + BC) + (AC + B'C)

= A’A + A’BC + AC + B’C
= A’BC + C(A + B’)
= C(A’B + A + B’)
= C(A + B + B’)
= C(A + 1)
= AC.

43. What is the simplification value of MN(M + N’) + M(N + N’)?
a) M
b) MN+M’N’
c) (1+M)
d) M+N’

Answer: b
Explanation: Given: MN(M + N’) + M(N + N’)
= MN(M+N’) + M.1
= MNM + MNN’ + M
= MN + 0 +M
= M(N + 1)
= M.

44. Simplify the expression XZ’ + (Y + Y’Z) + XY.
a) (1+XY’)
b) YZ + XY’ + Z’
c) (X + Y +Z)
d) XY’+ Z’

Answer: c
Explanation: Given: X Z’ + (Y + Y’Z) + XY
= XZ’ + (Y + Z) + XY
= XZ’ + Y + Z + XY
= (XZ’ + Z) + (Y + XY)
= (X + Z) + Y (1 + X)
= X + Y + Z.

45. Find the simplified term Y’ (X’ + Y’) (X + X’Y)?
a) XY’
b) X’Y
c) X + Y
d) X’Y’

Answer: a
Explanation: Given: Y’ (X’ + Y’) (X + X’Y)
= Y’(X’ + Y’)(X + Y)
= (X’Y’ + Y’)(X + Y)
= (XX’Y’ + X’Y’Y + XY’ + YY’)
= XY’.

46. If an expression is given that x+x’y’z=x+y’z, find the minimal expression of the function F(x,y,z) = x+x’y’z+yz?

a) y’ + z
b) xz + y’
c) x + z
d) x’ + y

Answer: c
Explanation: We have, x+x’y’z+yz
= x+y’z+yz [since, x+x’y’z=x+y’z]
= x+z(y’+y)
= x + z.

47. Simplify the expression: XY’ + X’ + Y’X’.
a) X’ + Y
b) XY’
c) (XY)’
d) Y’ + X

Answer: c
Explanation: Given XY’+X’+Y’X’ = Y’(X+X’) + X’ = Y’.1 + X’ = X’ + Y’ = (XY)’ [De Morgan’s law].

48. Minimize the Boolean expression using Boolean identities: A′B+ABC′+BC’+AB′C′.
a) B(AC)’ + AC’
b) AC’ + B’
c) ABC + B’ + C
d) BC’ + A’B

Answer: a
Explanation: Given: A′B+ABC′+BC’+AB′C′
= A’B + BC’ (1 + A) + AB’C”
= A’B + BC’ + AB’C’
= A’B + BC’ + BC’ + AB’C’
= B(A’ + C’) + C’(A + AB’)
= B(AC)’ + C’ A(1 + B’)
= B(AC)’ + AC’.

49. Minimize the following Boolean expression using Boolean identities.
F(A,B,C) = (A+BC’)(AB’+C)
a) A + B + C’
b) AC’ + B
c) B + AC
d) A(B’ + C)

Answer: d
Explanation: Given, F(A,B,C) = (A+BC’)(AB’+C)
= (AAB’ + BC’AB’ + AC + BC’C)
= (AB’ + 0 + AC + 0)
= A(B’ + C).

50. If A is “001100” and B is “010101” then what is the value of A (Ex-or) B?

a) 000000
b) 111111
c) 001101
d) 011001

Answer: d
Explanation: In Ex-or if both the inputs are same then output is 0 otherwise 1.

Digital Electronics and Introduction to IC Technology

51. Which number system has a base 16

e. Hexadecimal

f. Octal
g. Binary
h. Decimal

Answer: a

Explanation: Hexadecimal is a number system with a base 16. We can divide the word HEXA+DECIMAL for better understanding; it means 6 and 10 make 16. It is the easiest way to write and count numbers represented in terms of base 16. There are sixteen distinct digits in the hexadecimal system, it starts from 0, 1,2,3,4,5,6,7,8,9, A, B, C, D, E and end to F. Where A= 10, B=11, C=12, D=13, E=14, F=15. It is usually represented by 4 bits in binary number system by 8421 code.

52. The following hexadecimal number (1E.43)16 is equivalent to

e. $(36.506)_8$
f. $(36.206)_8$
g. $(35.506)_8$
h. $(35.206)_8$

Answer: b

Explanation:

If you want to convert a hexadecimal number into an octal number, the first thing you need to do is convert a hexadecimal number into binary form by writing the binary equivalent of each digit in the form of 4 bits. Once you write the number into binary form, you need to group the binary equivalent in 3 bits, then for each of the three bits, the respective digit is written.

$(1E.43)_{16}$ = $(0001\ 1110.0100\ 0011)_2$

= $(00011110.01000011)_2$

= $(011110.010000110)_2$

= $(011\ 110.010\ 000\ 110)_2$

= $(36.206)_8$

53. How many entries will be in the truth table of a 4-input NAND gate

e. 6
f. 8
g. 32

h. 16

Answer: d

Explanation:

A NAND gate is a universal logic gate that performs the negation (NOT) of an AND logic operations in digital circuits.

As we know,

Y = 2^n Y number of Entries in the truth table

Where, n = number of inputs.

54. How many bits are needed to store one BCD digit?

e. 2 bits
f. 4 bits
g. 3 bits
h. 1 bit

Answer: b

Explanation: BCD stands for Binary Coded Decimal. It is a type of binary encoding where each decimal digit is represented by a fixed number of bits, usually 4. It is also called 8421 code to represent the maximum number 15. BCD can encode only from 0-9. For example, Decimal number 456, its equivalent BCD code is 0100 0101 0110

55. Convert $(312)_8$ into decimal

e. $(201)_{10}$
f. $(202)_{10}$
g. $(203)_{10}$
h. $(204)_{10}$

Answer: b

Explanation:

Octal to decimal conversion is usually obtained by multiplying 8 to the power of base along with the value at the index position.

$(312)_8 = 3 * 8^2 + 1* 8^1 + 2* 8^0$

= 192 + 8 +2 = $(202)_{10}$

56. Which of these sets of logic gates are known as universal gates?

e. XOR, NAND, OR
f. OR, NOT, XOR
g. NOR, NAND, XNOR
h. NOR, NAND

Answer: d

Explanation: NAND or NOR gates are used to design all other logic gates, so; they are termed universal gates.

57. What is the addition of the binary number 101001+ 010011=?

e. 010100
f. 111100
g. 000111
h. 101110

Answer: b

Explanation: If you want to add any binary number, first, you need to know the binary addition rules.

0 + 1 = 1

1 + 0 = 1

0 + 0 = 0

1 + 1 = 0 (with carry 1)

101001+ 010011 = 111100

58. What is the binary subtraction of 101001 - 010110 =?

e. 010011
f. 100110
g. 011001
h. 010010

Answer: a

Explanation: If you want to subtract any binary number, first, you need to know the binary subtraction rules.

1 - 0 = 1

0 - 1 = 1 (With borrow 1)

0 - 0 = 0

1 - 1 = 0

therefore, the subtraction of 101001 - 010110 = 010011

59. What is the binary multiplication of 10100 * 01011 =?

e. 011011000
f. 011001100
g. 011011100
h. 011100011

Answer: c

Explanation: If you want to multiply any binary number, you need to know the binary multiplication rules.

1 * 0 = 0

0 * 1 = 0

0 * 0 = 0

1 * 1 = 1

therefore, the multiplication of 10100 - 01011 = 011011100

60. Divide the binary number: 111001 ÷ 1101 and find the reminder

e. 1010
f. 0110
g. 0101
h. 0011

Answer: c

Explanation:

If you want to divide any binary number, you need to know the binary division rule. The binary division is accomplished using the long division rule.

Therefore, the remainder of 111001 ÷ 1101 = 0101

61. A classification of integrated circuits with complexities of 30 to 300 equivalent gates on a single chip is known as?

e. VLSI
f. SSI
g. LSI
h. MSI

Answer: d

Explanation: The terminologies like MSI, SSI, LSI and VLSI came out from the complexity of the integrated circuit. It means the total number of transistors are fabricated on a single chip. Jack Kilby invented the first integrated circuit in 1959, so, after that, the Integrated circuit has emerged like SSI, LSI, MSI and VLSI.

In **MSI** (Medium Scale Integration) = **30 - 300** gates /chip (counters, multiplexers, registers)

In **LSI** (Large Scale Integration) = **300 - 3000** gates /chip (8-bit processors)

In SSI (Small-Scale Integration) = **3 - 30** gates /chip (logic gates, flip flops)

In VLSI (Very Large-Scale Integration) = **>3000** gates / chip (16 bit and 32- bit processors)

62. 1's complement of 1011001 is

e. 0100111
f. 0101100
g. 0100110
h. 0110110

Answer: c

Explanation:

If you want to calculate 1's complement of any binary number, you need to reverse its binary bits. All the 0's to 1's and 1's to 0's.

Therefore, 1's complement of 1011001 = 0100110

63. **2's complement of 1011011 is**

e. 0100011
f. 0110101
g. 0100011
h. 0100101

Answer: d

Explanation: If you want to calculate 2's complement of any binary number, first you need to calculate 1's complement of that number and then add 1 to it.

2's complement of 1011011 = 0100100 + 1 = 0100101.

64. **A digital circuit that can store only one bit is a**

e. Register
f. NOR gate
g. Flip-flop
h. XOR gate

Answer: c

Explanation: A flip-flop refers to an electronic circuit with two stable states that can be used to store the binary data (1,0). Flip-flop can store only one bit of data, either a logic 1 or 0. This logic state can be represented as the voltage on the flip-flop's output because it can be controlled to hold the logic state, effectively a 1 -bit memory.

65. **In Digital electronics (Boolean algebra), the OR operation is performed by which of the given properties**

e. Distributive properties
f. Commutative properties
g. Associative properties
h. All of these

Answer: d

Explanation:

In Boolean algebra, the distributive properties are given by the following equation:

A + BC = (A+B) (A+C) & A(B+C) = AB+AC

In Boolean algebra, the commutative properties are given by the following equation:

A+B = B+A & A*B = B*A

In Boolean algebra, the distributive properties are given by the following equation:

A+(B+C) = (A+B) +C & A*(B*C) = (A*B) *C

66. De-Morgan's Law states that

e. (A+B)' = A'*B
f. (AB)' = A' + B'
g. (AB)' = A' + B
h. (AB)' = A + B

Answer: b

Explanation: DeMorgan's theorems play a vital role in digital electronics. It gives an equivalency between the logic gates. There are two distinct types of DeMorgan's theorems: the first gives the equivalent of the NAND gate, and the other gives the equivalent of the NOR gate. As per the dual property of DeMorgan's theorem (AB)' = A' + B' & (A+B) = A' * B'

67. The logical sum of two or more than two logical products is termed as

e. OR operation
f. POS
g. SOP
h. NAND operation

Answer: c

Explanation: SOP stands for "Sum of products." SOP is a way that a Boolean Algebra formula can be written. For example, the sum of product formula: AB + A'B'. In other words, it is defined as the logical sum of two or more logical product terms. POS refers to the logical product of two or more than two logical sum terms.

68. The Minterms for four variables

e. 8
f. 16
g. 2
h. 1

Answer: b

Explanation:

Minterms is given by the following formula

Minterm = 2^n

Therefore, 2^4= 16 minterms are needed.

69. **A K-map (Karnaugh map) is an abstract form of which diagram organized as a squares matrix.**

   e. Block diagram
   f. Cycle diagram
   g. Square diagram
   h. Venn diagram

Answer: d

Explanation: K- Map, also known as Karnaugh map, refers to a pictorial representation of a truth table. It helps in minimizing variables of any Boolean expression. It is also an abstract form of a Venn diagram arranged as a square of a matrix, where each square represents a minterm or maxterm.

70. **One nibble is equal to how many bits**

   e. 4
   f. 2
   g. 16
   h. 8

Answer: a

Explanation: In digital electronics, the smallest unit of storage consisting of either 0 or 1 is called a bit. The arrangement of such 4 bits is known as a nibble. The arrangement of such 8 bits is known as a byte.

71. **Suppose the output of an XNOR gate is 1. Which of the given input combination is correct?**

   e. A = 0, B' = 1
   f. A = 1, B = 1
   g. A = 0, B = 1
   h. A = 0, B = 0

Answer: d

Explanation:

An XNOR refers to a digital logic gate with two or more inputs and one output that executes logical equality. The output of an XNOR gate is true either all of its inputs are true, or all of its inputs are false. When one of its inputs is false, and others are true, then the output is false. The output of the XNOR gate is given by the following equation.

AB + A'B,' For **A = 0** AND **B = 0** the output will be 1.

72. The AND operation is equivalent to

e. Union
f. Intersection
g. Division
h. Both option a and b

Answer: b

Explanation: AND operation is equivalent to Intersection. It means Y = A.B i.e. A AND B = A Intersection B. The output is 1, if and only if all the given inputs are 1.

73. Positive integers must be represented by

e. Signed numbers
f. Unsigned numbers
g. Both option a and b
h. None of the above

Answer: b

Explanation: The negative integers are represented by signed numbers on the extreme left side, whereas the positive integers are represented using unsigned numbers.

74. What is the radix of the octal number system?

e. 2
f. 10
g. 8
h. 16

Answer: c

Explanation: A radix of a number system refers to the number of base digits, including zero, that are used to represent large values. In the binary number system, that would be 2 (0,1). In the octal number system, that would be 8 (0 to 7). In the decimal number system, that would be 10 (0 to 9). In the hexadecimal number system, that would be 16 (0 to 15).

75. Which integrated circuit is having more that 100 gates?

e. Small-scale integration (SSI)
f. Medium-scale integration (MSI)
g. Large-scale integration (LSI)
h. Very large-scale integration (VLSI)

Answer: **Option C**

76. Which integrated circuit is having 10 to 100 gates?

e. Small-scale integration (SSI)
f. Medium-scale integration (MSI)
g. Large-scale integration (LSI)
h. Very large-scale integration (VLSI)

Answer: **Option B**

77. Integrated circuits having up to 9 gates is called

e. Small-scale integration (SSI)
f. Medium-scale integration (MSI)
g. Large-scale integration (LSI)
h. Very large-scale integration (VLSI)

Answer: **Option A**

78. Small Scale Integration(SSI) refers to ICs with __________ gates on the same chip.

e. Fewer than 10
f. Greater than 10
g. Equal to 10
h. Greater than 50

Answer: a

Explanation: Small Scale Integration(SSI) refers to ICs with fewer than 10 gates on the same chip.

79. MSI means ___________

a) Merged Scale Integration
b) Main Scale Integration
c) Medium Scale Integration
d) Main Set Integration
View Answer

Answer: c
Explanation: MSI means Medium Scale Integration.

80. MSI includes _______ gates per chip.

a) 12 to 100
b) 13 to 50
c) greater than 10
d) greater than 100

Answer: a
Explanation: Medium Scale Integration includes 12 to 100 gates per chip.

81. LSI means ________ and refers to ________ gates per chip.
a) Long Scale Integration, more than 10 upto 10000
b) Large Scale Integration, more than 100 upto 5000
c) Large Short Integration, less than 10 and greater than 5000
d) Long Short Integration, more than 10 upto 10000

Answer: b
Explanation: The full form of LSI is Large Scale Integration and refers to more than 100 upto 5000 gates per chip.

82. How many gates per chip are used in first generation Integrated Circuits?
a) 3-30
b) 30-300
c) 300-3000
d) More than 3000

Answer: a
Explanation: The first generation ICs belongs to small scale integration, which consists of 3-30 gates per chip (approximately).

83. Find the chip area for a Medium Scale Integration IC?
a) 8 mm^3
b) 4 mm^2
c) 64 mm^3
d) 16 mm^2

Answer: d
Explanation: The approximate length and breadth of Medium Scale Integration would be 4 mm. Therefore, its area is given as = length × breadth = 4mm × 4mm = $16mm^{2.}$

84. The number of transistors used in Very Large Scale Integration is
a) 10^7 transistors/chip
b) $10^6 – 10^7$ transistors/chip
c) $20^3 – 10^5$ transistors/chip
d) $10^2 – 20^3$ transistors/chip

Answer: c
Explanation: Very Large Scale Integration (VLSI) ICs are fabricated using more than 3000 gates/chip, which is equivalent to 20,000 – 1,00,00,00 transistors/chip.

85. Determine the chip area for Large Scale Integration ICs.

a) 1,00,000 mil^2
b) 10,000 mil^2
c) 1,60,000 mil^2
d) 16,000 mil^2

Answer: c
Explanation: The chip area for a Large Scale Integration IC is 1 cm^2.
=> Area of LSI = 10mm × 10mm = 1cm × 1 cm = $1cm^2$.
=> 1,60,000mil^2 (1cm=400mil).

86. The concept of Integrated circuits was introduced at the beginning of 1960 by

a) Texas instrument and Fairchild Semiconductor
b) Bell telephone laboratories and Fair child Semiconductor
c) Fairchild Semiconductor
d) Texas instrument and Bell telephone Laboratories

Answer: a
Explanation: The concept of Integrated circuits was introduced by Texas instrument and Fairchild Semiconductor, whereas Bell telephone laboratories developed the concept of transistors.

87. There are ______ cells in a 4-variable K-map.

a) 12
b) 16
c) 18
d) 8

Answer: b
Explanation: There are 16 = (2^4) cells in a 4-variable K-map.

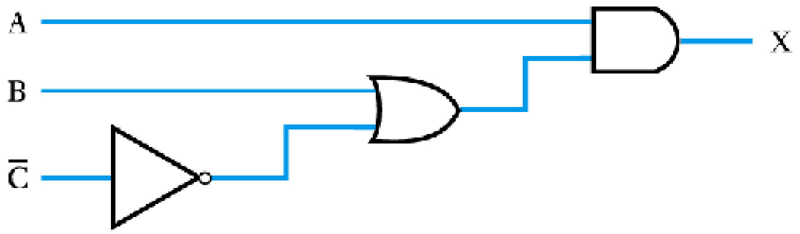
88. Don’t care conditions can be used for simplifying Boolean expressions in ___________

a) Registers
b) Terms
c) K-maps
d) Latches

Answer: c

Explanation: Don’t care conditions can be used for simplifying Boolean expressions in K-maps which helps in pairing with 1/0.

89. What Boolean expression describes the output X of this arrangement?



X = A + B + C
X = A.(B + C)
X = A + (B.C)
X = (A.B) + C

90. Find the simplified expression A’BC’+AC’.
a) B
b) A+C
c) (A+B)C’
d) B’C

Answer: c
Explanation: Given: A’BC’ + AC’
= C’(A’B + A)
= C’(A + B).

91. Evaluate the expression: (X + Z)(X + XZ’) + XY + Y.
a) XY+Z’
b) Y+XZ’+Y’Z
c) X’Z+Y
d) X+Y

Answer: d
Explanation: (X + Z)(X + XZ’) + XY + Y [Original Expression]
= (x + z)X(1 + Z’) + XY + Y [Distributive]
= (X + Z)X + XY + Y [Complement, Identity]
= (X+Z)X + Y(X+1) [Distributive]
= (X+Z)X + Y [Idempotent]
= XX + XZ + Y [Distributive]
= X + XZ + Y [Identity]
= X(1+Z) + Y
= X + Y [Idempotent].

92. Simplify the expression: A’(A + BC) + (AC + B’C).
a) (AB’C+BC’)
b) (A’B+C’)
c) (A+ BC)
d) AC

Answer: b
Explanation: Given: A’(A + BC) + (AC + B’C)

= A’A + A’BC + AC + B’C
= A’BC + C(A + B’)
= C(A’B + A + B’)
= C(A + B + B’)
= C(A + 1)
= AC.

93. What is the simplification value of MN(M + N’) + M(N + N’)?
a) M
b) MN+M’N’
c) (1+M)
d) M+N’

Answer: b
Explanation: Given: MN(M + N’) + M(N + N’)
= MN(M+N’) + M.1
= MNM + MNN’ + M
= MN + 0 +M
= M(N + 1)
= M.

94. Simplify the expression XZ’ + (Y + Y’Z) + XY.
a) (1+XY’)
b) YZ + XY’ + Z’
c) (X + Y +Z)
d) XY’+ Z’

Answer: c
Explanation: Given: X Z’ + (Y + Y’Z) + XY
= XZ’ + (Y + Z) + XY
= XZ’ + Y + Z + XY
= (XZ’ + Z) + (Y + XY)
= (X + Z) + Y (1 + X)
= X + Y + Z.

95. Find the simplified term Y’ (X’ + Y’) (X + X’Y)?
a) XY’
b) X’Y
c) X + Y
d) X’Y’

Answer: a
Explanation: Given: Y’ (X’ + Y’) (X + X’Y)
= Y’(X’ + Y’)(X + Y)
= (X’Y’ + Y’)(X + Y)
= (XX’Y’ + X’Y’Y + XY’ + YY’)
= XY’.

96. If an expression is given that x+x’y’z=x+y’z, find the minimal expression of the function F(x,y,z) = x+x’y’z+yz?

a) y’ + z
b) xz + y’
c) x + z
d) x’ + y

Answer: c
Explanation: We have, x+x’y’z+yz
= x+y’z+yz [since, x+x’y’z=x+y’z]
= x+z(y’+y)
= x + z.

97. Simplify the expression: XY’ + X’ + Y’X’.
a) X’ + Y
b) XY’
c) (XY)’
d) Y’ + X

Answer: c
Explanation: Given XY’+X’+Y’X’ = Y’(X+X’) + X’ = Y’.1 + X’ = X’ + Y’ = (XY)’ [De Morgan’s law].

98. Minimize the Boolean expression using Boolean identities: A′B+ABC′+BC’+AB′C′.
a) B(AC)’ + AC’
b) AC’ + B’
c) ABC + B’ + C
d) BC’ + A’B

Answer: a
Explanation: Given: A′B+ABC′+BC’+AB′C′
= A’B + BC’ (1 + A) + AB’C”
= A’B + BC’ + AB’C’
= A’B + BC’ + BC’ + AB’C’
= B(A’ + C’) + C’(A + AB’)
= B(AC)’ + C’ A(1 + B’)
= B(AC)’ + AC’.

99. Minimize the following Boolean expression using Boolean identities.
F(A,B,C) = (A+BC’)(AB’+C)
a) A + B + C’
b) AC’ + B
c) B + AC
d) A(B’ + C)

Answer: d
Explanation: Given, F(A,B,C) = (A+BC’)(AB’+C)
= (AAB’ + BC’AB’ + AC + BC’C)
= (AB’ + 0 + AC + 0)
= A(B’ + C).

100. **If A is “001100” and B is “010101” then what is the value of A (Ex-or) B?**

a) 000000
b) 111111
c) 001101
d) 011001

Answer: d
Explanation: In Ex-or if both the inputs are same then output is 0 otherwise 1.

Emerging Domain in Electronics Engineering

B. Tech 1st year

Unit V

AMPLITUDE MODULATION

1. **In amplitude modulation, which among the following is constant?**

   a) Amplitude

   b) Frequency

   c) Wave length

   d) Time period

   Answer: b

   Explanation: In amplitude modulation, the carrier wave has constant frequency and the modulating wave information is conveyed by the amplitude of the carrier waves.

2. **Lower frequency is not suitable in_________**

   a) Direct transmission

   b) Distance calculation

   c) Determination of wavelength

   d) Determination of frequency

   Answer: a

   Explanation: The range of lower frequency is not suitable in case of direct transmission through the atmosphere because it may involve in atmospheric conditions like interference, reflection, fading and scattering. This may decrease the impact of frequency which may reduce the information being transmitted.

3. **Which of the following represents the correct set of modulation classification?**

   a) Frequency, time period

   b) Frequency, amplitude

   c) Amplitude, wavelength

   d) Wavelength, frequency

   Answer: b

   Explanation: The interference technique can be eradicated by modulation, which involves two classifications. They are amplitude and frequency modulations, which can be super imposed during phase comparison.

4. **Which of the following is constant in the case of Amplitude modulation?**

   a) Modulation

   b) Wavelength

   c) Amplitude

d) Frequency

Answer: d

Explanation: In amplitude modulation, the carrier wave has constant frequency.

5. **Which can’t be done in high frequency zones?**

a) Phase comparison

b) Super imposition of waves

c) Distance measurement

d) Wavelength measurement

Answer: a

Explanation: In high frequency zones, the phase comparison techniques cannot be applied. The high frequency may be determined as $5*10^8$ Hz which may correspond to a wave length of 0.6 m.

6. **Modulating signal can also be known as ______**

a) Total wave

b) Messagesignal

c) Super wave

d) Incubation wave

Answer: b

Explanation: Modulation involves the overcoming of the problems raised due to the interference, scattering, etc. In this, the measuring wave is super imposed on a carrier wave of high frequency, so it is also known as measuring wave.

7. **If 10mm is the accuracy considered, what will be the maximum value of λ for 1/1000 part?**

a) 10000 m

b) 10 cm

c) 10 m

d) 10000 cm

Answer: c

Explanation: The maximum value of the wave length can be determined by multiplying assumed wave length with the accuracy considered, which means, $\lambda = 10*1000 = 10$ m.

8. **In Amplitude Modulation, the instantaneous values of the carrier amplitude changes in accordance with the amplitude and frequency variations of the modulating signal.**

a) True

b) False

Answer: a

Explanation: In Amplitude Modulation, the amplitude of the carrier sine wave is varied by the value of the information signal. The instantaneous value of the carrier amplitude changes in accordance with the amplitude and frequency variations of the modulating signal. The carrier frequency remains constant during the modulation process, But its amplitude varies in accordance with the modulating signal.

9. What is the line connecting the positive and negative peaks of the carrier waveform called?

a) Peak line

b) Maximum amplitude ceiling

c) Modulation index

d) Envelope

Answer: d

Explanation: An imaginary line connecting the positive peaks and negative peaks of the carrier waveform gives the exact shape of the modulating information signal. This line is known as the envelope.

10. What is the reference line for the modulating signal?

a) Zero line

b) Carrier peak line

c) Modulated peak line

d) Un-modulated peak line

Answer: b

Explanation: The modulating signal uses the peak value of the carrier rather than zero as its reference point. The envelope varies above and below the peak carrier amplitude. The zero reference line of the modulating signal coincides with the peak value of the unmodulated carrier.

11. What happens when the amplitude of the modulating signal is greater than the amplitude of the carrier?

a) Decay

b) Distortion

c) Amplification

d) Attenuation

Answer: b

Explanation: The zero reference line of the modulating signal coincides with the peak value of the unmodulated carrier. Because of this, the relative amplitudes of the carrier and modulating signal are important. When the amplitude of the modulating signal is greater than the amplitude of the carrier, distortion will occur.

12. What is the effect of distortion?

a) Total information loss

b) Error information

c) Attenuated information

d) Amplified information

Answer: b

Explanation: Distortion occurs when the modulating signal amplitude is greater than the amplitude of the carrier, causing incorrect information to be transmitted. In amplitude modulation, it is particularly important that the peak value of the modulating signal be less than the peak value of the carrier.

13. What is the circuit used for producing AM called?

a) Modulator

b) Transmitter

c) Receiver

d) Duplexer

Answer: a

Explanation: The circuit used for producing AM is called a modulator. It has two inputs, the carrier and the modulating signal, and the resulting output is the modulated signal. Amplitude modulators compute the product of the carrier and modulating signals.

14. The ratio between the modulating signal voltage and the carrier voltage is called?

a) Amplitude modulation

b) Modulation frequency

c) Modulation index

d) Ratio of modulation

Answer: c

Explanation: For undistorted modulation to occur, the voltage of modulating signal Vm must be less than the carrier voltage Vc. Therefore, the relationship between the amplitude of the modulating signal and the amplitude of the carrier signal is important. This relationship, known as the modulation index m, is the ratio $m = V_m / V_c$.

15. **When does over-modulation occur?**

a) Modulating signal voltage < Carrier voltage

b) Modulating signal voltage > Carrier voltage

c) Modulating signal voltage = Carrier voltage

d) Modulating signal voltage =0

Answer: b

Explanation: Over-modulation is a condition in which the modulating signal voltage is much greater than the carrier voltage. The received signal will produce an output waveform in the shape of the envelope, whose negative peaks have been clipped off.

16. **What is the condition for greatest output power at the transmitter without distortion?**

a) Modulating signal voltage > Carrier voltage

b) Modulating signal voltage < Carrier voltage

c) Modulating signal voltage = Carrier voltage

d) Modulating signal voltage = 0

Answer: c

Explanation: When the modulation index is 1 or the percentage of modulation is 100, modulating signal voltage is equal to the carrier voltage. This results in the greatest output power at the transmitter and the greatest output voltage at the receiver, with no distortion.

17. **Which of the following modulating signal voltage would cause over-modulation on a carrier voltage of 10v?**

a) 9.5

b) 9.99

c) 10

d) 12

Answer: d

Explanation: When the voltage of the modulating signal exceeds the voltage of the carrier signal over-modulating occurs. Here, 12/10 = 1.2 which is greater than 1 and hence would cause over-modulation.

18. **What is the percentage of modulation if the modulating signal is of 7.5V and carrier is of 9V?**

a) 100

b) 91

c) 83.33

d) 0

Answer: c

Explanation: modulation index m = $^{V}{m}/_{Vc}$ = $^{7.5}/_{9}$* 100 = 83.33.

19. What is the purpose of peak clipper circuits in radios?

a) prevent overmodulation

b) reduce bandwidth

c) increase bandwidth

d) regulate oscillator input voltage

Answer: a

Explanation: Clipper is used to prevent the output of a circuit from exceeding a predetermined voltage. It does not distorted the remaining part of the applied waveform.

20. What is the main function of a balanced modulator?

a) to limit the noise picked by a receiver

b) to produce balanced modulation of a carrier wave

c) to suppress carrier signal

d) to produce 100% modulation

Answer: d

Explanation: For achieving 100% modulation, balanced modulator is mainly used in circuits.

21. For classifying a modem as low speed its data rate is ________

a) upto 100bps

b) upto 200bps

c) upto 400bps

d) upto 600bps

Answer: d

Explanation: According to standard data for modem, if the data rate is upto 600bps then modem is classified as having a low speed.

22. Which of the following modulating signal voltage would cause over-modulation on a carrier voltage of 10v?

a) 9.5

b) 9.99

c) 10

d) 12

Answer: d

Explanation: When the voltage of the modulating signal exceeds the voltage of the carrier signal over-modulating occurs. Here, 12/10 = 1.2 which is greater than 1 and hence would cause over-modulation.

23. What is the reason of "envelope" in an amplitude modulated signal?

a) noise signal

b) carrier signal

c) nematic signal

d) baseband signal

Answer: d

Explanation: Envelope is basically a smooth curve that outlines the extremes of any baseband signal. So basically it is message or baseband signal that determines the envelope.

24. What is the equation for full-carrier AM?

a) $V(t) = (E_c + E_m) \times (\sin \omega_c t)$

b) $V(t) = (E_c + E_m) \times (\sin \omega_m t) + (\sin \omega_c t)$

c) $V(t) = (E_c \times E_m) \times (\sin \omega_m t) \times (\sin\omega_c t)$

d) $V(t) = (E_c + E_m \sin \omega_m t) \times (\sin \omega_c t)$

Answer: d

Explanation: Amplitude modulation is the change in the amplitude of carrier wave in proportion to the instantaneous amplitude of the message signal. A carrier can be seen as a waveform with frequency higher than the message signal frequency, that is modulated with respect to input signal for the purpose of transmitting information. The equation for full-carrier AM is $V(t) = (E_c + E_m \sin\omega_m t) \times (\sin \omega_c t)$.

25. What is the cause of Overmodulation?

a) distortion

b) splatter

c) both distortion and splatter

d) half reception of signals

Answer: c

Explanation: Overmodulation is the process in which the modulation index is greater than 1 such that the modulating signal voltage exceeds the required voltage to produce 100% modulation. It results out of both distortion and splatter of waveform and causes distortion and overlapping

26. If AM radio station increases its modulation index then the audio gets louder at the receiver.

a) True

b) False

Answer: a

Explanation: Modulation index tells us the amount by which the carrier wave is varied with respect to the message signal. If we increase the modulation index then audio signal gets louder.

27. The modulation index can be derived from ________

a) frequency-domain signal

b) time-domain signal

c) both frequency and time domain signal

d) a highly modulated carrier wave

Answer: c

Explanation: Modulation index tells us the amount by which the carrier wave is varied with respect to the message signal. It can be derived for frequency-domain signals as well as for time-domain signals.

28. A single sideband modulation system is more efficient than a plain amplitude modulated system.

a) True

b) False

Answer: a

Explanation: In Single Sideband transmission, the carrier is suppressed and only either of the two sidebands is transmitted. Thus, it reduces the total power consumption and also reduces the bandwidth required. Whereas, in AM, the carrier being transmitted along with both the sidebands entails more power and larger bandwidth.

29. Why AM stations has “low-fidelity”?

a) AM is susceptible to noise

b) Commercial AM stations use low power

c) Commercial AM stations have a narrow bandwidth

d) High quantization to noise ratio

Answer: c

Explanation: Fidelity is the ability of receivers to reproduce all modulating signals eually. Low fidelity can be seen as sound recording that contain technical flaws to make sound better compared with the sound that is recorded live. High fidelity refers to the equipment that very accurately produces without any harmonic or resonance. AM stations have low fidelity to have narrow bandwidth.

30. Calculate the power in one of the side band in SSBSC modulation when the carrier power is 124W and there is 80% modulation depth in the amplitude modulated signal.

a.) 89. 33 W

b.) 64. 85 W

c.) 79.36 W

d.) 102 W

Answer: c) 79.36 W

Explanation:

Modulation Index= 0.8

Pc = 124W

Power in sidebands may be calculated as = m2 Pc/4

= (0.8)2 * 124/4

= 79.36 W

31. Calculate the total modulation Index when a carrier wave is being modulated by two modulating signals with modulation indices 0.8 and 0.3.

a.) 0.8544

b.) 0.6788

c.) 0.9999

d.) 0.5545

Answer: a) 0.8544

Explanation:

Here, m1 = 0.8

m2 = 0.3

total modulation index mt = √(m12 + m22)

= √(0.82 + 0.32)

= √ 0.73

= 0.8544 = 85.44%

32. Calculate the frequencies available in the frequency spectrum when a 2MHz carrier is modulated by two sinusoidal signals of 350Hz and 600Hz.

a.) 2000.35, 1999.65 and 2000.6, 1999.4

b.) 1999.35, 1999.65 and 2000.6, 2000.4

c.) 2000.35, 2000.65 and 2000.6, 2000.4

d.) 1999.35, 1999.65 and 1999.6, 1999.4

Answer: a) 2000.35, 1999.65 and 2000.6, 1999.4

Explanation:

The frequencies obtained in the spectrum after the amplitude modulation are

fc+fm and fc+fm

therefore,

the available frequencies after modulation by 0.350 KHz are

2000KHz+ .350 KHz = 2000.35 and 2000KHz – 0.350 KHz = 1999.65

the available frequencies after modulation by 0.6 KHz are

2000KHz+0 .6 KHz = 2000.6 and 2000KHz – 0.6 KHz = 1999.4

33. If an AM signal is represented byv = (15 + 3 Sin(2Π * 5 * 103 t)) * Sin(2Π * 0.5 * 106 t) volts

i.) Calculate the values of the frequencies of carrier and modulating signals.

ii.) Calculate the value of modulation index.

iii.) Calculate the value of bandwidth of this signal.

a.) 1.6MHz and 8KHz, 0.6, 16 MHz

b.) 1.9MHz and 18KHz, 0.2, 16 KHz

c.) 2.4 MHz and 18KHz, 0.2, 16 KHz

d.) 1.6MHz and 8KHz, 0.2, 16 KHz

Answer: d) 1.6MHz and 8KHz, 0.2, 16 KHz

Explanation:

The amplitude modulated wave equation is

v = (10 + 2 Sin(2Π * 8 * 103 t)) * Sin(2Π * 1.6 * 106 t) volts

Instantaneous value of AM signal is represented by the equation

v = {Vc + Vm Sin (ωm t)} * Sin (ωc t)

comparing it with the given equation,

Vc = 10 V

Vm = 2V

ωc (= 2Π fc) = 2Π * 1.6 * 106

ωm (= 2Π fm) = 2Π * 8 * 103

(i) The carrier frequency fc is = 1.6 * 106 = 1.6 MHz

The modulating frequency fm is = 8* 103 = 8 kHz

(ii) The modulation index m = Vm/Vc = 2/10 = 0.2

(iii) The bandwidth BW = 2 fm = 16 kHz

34. An AM signal has a total power of 48 Watts with 45% modulation. Calculate the power in the carrier and the sidebands.

a.) 39.59 W, 4.505W

b.) 40.59 W, 4.205W

c.) 43.59 W, 2.205W

d.) 31.59 W, 8.205W

Answer: c) 43.59 W, 2.205W

Explanation:

Given that Pt = 48 W

Modulation index m= 0.45

The total power in an AM is given by

Pt= Pc (1 + m2/2)

= Pc (1 +0.452/2)

48 = Pc * 1.10125

Therefore, Pc = 48/ 1.10125

= 43.59 W

The total power in two sidebands is 48 – 43.59 = 4.41 W

So the power in each sideband is 4.41/2 = 2.205 W

35. Calculate the power saved in an Amplitude Modulated wave when it is transmitted with 45% modulation

– Without carrier

– Without carrier and a sideband

a.) 90%, 95%

b.) 82%, 91%

c.) 82%, 18%

d.) 68%, 16%

Answer: a) 90%, 95%

Explanation:

The total power in an AM is given by

Pt= Pc (1 + m2/2)

Given: m= 0.45

Therefore Pt= Pc (1 +0.452/2)

Pt= Pc *1.10125

Pc/ Pt = 1/1.10125

= 0.908

= 90%

This shows that the carrier occupies 90% of total power. So 90% of total power may be saved if carrier is suppressed in the AM signal.

(ii) If one of the sidebands is also suppressed, half of the remaining power will be saved i.e., 10/2 = 5 %. So a total of 95% (90% + 5%) will be saved when carrier and a side band are suppressed.

36. What is the carrier frequency in an AM wave when its highest frequency component is 850Hz and the bandwidth of the signal is 50Hz?

a.) 80 Hz

b.) 695 Hz

c.) 625 Hz

d.) 825 Hz

Answer: d) 825 Hz

Explanation:

Upper frequency = 850Hz

Bandwidth = 50Hz

Therefore lower Frequency = 850-50= 800 Hz

Carrier Frequency = (850-800)/2

= 825 Hz

37. The antenna current of the transmitter is 10A. Find the percentage of modulation when the antenna current increases to 10.4A.

a.) 32%

b.) 28.5%

c.) 64%

d.) 40%

Answer: b) 28.5%

Explanation:

It= Ic √(1+ m2/2)

10.4= 10 √(1+ m2/2)

√ (1+ m2/2) = 1.04

Therefore m= 0.285

= 28.5%

38. Demodulation is:

a.) detection

b.) recovering information from modulated signal

c.) a) and b)

d.) none of the above

Answer: c.) a) and b)

Explanation:

Demodulation is the process of recovering the original information from a modulated carrier wave. Systems are designed to be used as demodulators that detect the information signal from the carrier. The envelope detector and product detector are few of the AM detectors.

39. Calculate the side band power in an SSBSC signal when there is 50% modulation and the carrier power is 50W.

a.) 50W

b.) 25 W

c.) 6.25 W

d.) 12.5 W

Correct Answer : 6.25 W

Explanation:

The side band power is given by

Pc m2/2

= 50* (0.5) 2/2

=6.25W

40. Calculate the modulation index when the unmodulated carrier power is 15KW, and after modulation, carrier power is 17KW.

a.) 68%

b.) 51.63%

c.) 82.58%

d.) 34.66%

answer: b.) 51.63%

Explanation:

The total power in an AM is given by

Pt= Pc (1 + m2/2)

17= 15(1 + m2/2)

m2/2= 0.134

m=0.5163

= 51.63%

41. Calculation of modulation index using antenna current. An AM transmitter has an antenna current changing from 5 A un modulated to 5.8 A. What is the percentage of modulation?

a.) 38.8%

b.) 83.14 %

c.) 46.8%

d.) 25.2%

Correct Answer: 83.14 %

Explanation:

Modulation index m is given by

m= √ (2{It/Ic}2-1)

= √ (2 (5.8/5)2 -1)

= √ (2 (5.8/5)2 -1)

= 0.8314

= 83.14%

42. The antenna current of the transmitter is 10A. Find the percentage of modulation when the antenna current increases to 10.4A.

a.) 32%

b.) 28.5%

c.) 64%

d.) 40%

Answer: b) 28.5%

Explanation:

It= Ic√(1+ m2/2)

10.4= 10 √(1+ m2/2)

√ (1+ m2/2) = 1.04

Therefore m= 0.285

= 28.5%

43. What is the change in the value of transmitted power when the modulation index changes from 0 to 1?

a.) 100%

b.) Remains unchanged

c.) 50%

d.) 80%

Answer: c) 50%

Explanation:

Pt= Pc (1 + m2/2)

Pt= Pc (1 + 02/2) = Pc……………..(1)

New total power Pt1= Pc (1 + 12/2)

= Pc *3/2……………..(2)

(2) / (1),

We get , Pt1/ Pt= 3/2= 1.5

Pt1= 1.5 Pt

i.e. there is increase in total power by 50%

44. An AM signal has a total power of 48 Watts with 45% modulation. Calculate the power in the carrier and the sidebands.

a.) 39.59 W, 4.505W

b.) 40.59 W, 4.205W

c.) 43.59 W, 2.205W

d.) 31.59 W, 8.205W

Answer: c) 43.59 W, 2.205W

Explanation:

Given that Pt = 48 W

Modulation index m= 0.45

The total power in an AM is given by

Pt= Pc (1 + m2/2)

= Pc (1 +0.452/2)

48 = Pc * 1.10125

Therefore, Pc = 48/ 1.10125

= 43.59 W

The total power in two sidebands is 48 – 43.59 = 4.41 W

So the power in each sideband is 4.41/2 = 2.205 WNumerical – Power saving in AM when carrier and side band are suppressed

45. **This shows that the carrier occupies 90% of total power. So 90% of total power may be saved if carrier is suppressed in the AM signal.**

(ii) If one of the sidebands is also suppressed, half of the remaining power will be saved i.e., 10/2 = 5 %. So a total of 95% (90% + 5%) will be saved when carrier and a side band are suppressed.

46. **What is the change in the value of transmitted power when the modulation index changes from 0 to 1?**

a.) 100%

b.) Remains unchanged

c.) 50%

d.) 80%

Answer: c) 50%

Explanation:

Pt= Pc (1 + m2/2)

Pt= Pc (1 + 02/2) = Pc……………..(1)

New total power Pt1= Pc (1 + 12/2)

= Pc *3/2……………..(2)

(2) / (1),

We get , Pt1/ Pt= 3/2= 1.5

Pt1= 1.5 Pt

i.e. there is increase in total power by 50%

47. An AM broadcast station transmits modulating frequencies up to 6 kHz. If the AM station is transmitting on a frequency of 894 kHz, the values for maximum and minimum upper and lower sidebands and the total bandwidth occupied by the AM station are:

a.) 900 KHz, 888KHz, 12 KHz

b.) 894 KHz, 884 KHz, 12 KHz

c.) 894 KHz, 888 KHz, 6 KHz

d.) 900 KHz, 888 KHz, 6 KHz

Correct Answer: a) 900 KHz, 888KHz, 12 KHz

Explanation:

Maximum Frequency fUSB = 894 + 6 = 900 kHz

Minimum Frequency fLSB = 894 – 6 = 888 kHz

Bandwidth BW = fUSBfLSB = 900 888 = 12 kHz OR = 2(6 kHz) = 12 kHz

INTRODUCTION TO WIRELESS COMMUNICATION

48. The modulation technique used for mobile communication systems during world war II was

a. Amplitude modulation

b. Frequency modulation

c. ASK

d. FSK

ANSWER: b. Frequency modulation

49. ----------- introduced Frequency Modulation for mobile communication systems in 1935.

a. Edwin Armstrong

b. Albert Einstein

c. Galileo Galilei

d. David Bohm

ANSWER: a. Edwin Armstrong

50. The early FM push-to-talk telephone systems were used in

a. Simplex mode

b. Half duplex mode

c. Full duplex mode

d. None of the above

ANSWER: b. Half duplex mode

51. DECT stands for

a. Digital European Cellular Telex

b. Digitized Emergency Cellular Telephone

c. Digital European Cordless Telephone

d. Digital European Cellular Telephone

ANSWER: c. Digital European Cordless Telephone

52. World's first cellular system was developed by

a. Nippon Telephone and Telegraph (NTT)

b. Bellcore and Motorola

c. AT&T Bell Laboratories

d. Qualcomm

ANSWER: a. Nippon Telephone and Telegraph (NTT)

53. Paging systems were based on

a. Simplex systems

b. Half duplex systems

c. Full duplex systems

d. None of the above

ANSWER: a. Simplex systems

54. Paging systems could be used to

a. Send numeric messages

b. Send alphanumeric messages

c. Voice message

d. All of the above

ANSWER: d. All of the above

55. Garage door opener is a

a. Transmitter

b. Receiver

c. Transceiver

d. None of the above

ANSWER: a. Transmitter

56. Carrier frequency of a TV remote control is in the range

a. of Infra red

b. < 100MHz

c. < 1 GHz

d. < 2 GHz

ANSWER: a. of Infra red

57. Half duplex system for communication has

a. Communication in single direction

b. Communication in single direction at a time

c. Communication in both directions at the same time

d. None of the above

58. MIN stands for

a. Mobile Identification Number

b. Mobile Internet

c. Mobility In Network

d. None of the above

ANSWER: a. Mobile Identification Number

59. The process of transferring a mobile station from one base station to another is

a. MSC

b. Roamer

c. Hand off

d. Forward channel

ANSWER: c. Hand off

Second Generation (2G) cellular networks

60. The 2G cellular network uses

a. TDMA/FDD

b. CDMA/ FDD

c. Digital modulation formats

d. All of the above

ANSWER: d. All of the above

61. NADC is a 2G standard for

a. TDMA

b. CDMA

c. None of the above

ANSWER: a. TDMA

62. 2G CDMA standard - cdmaone supports up to

a. 8 users

b. 64 users

c. 32 users

d. 116 users

ANSWER: b. 64 users

63. 2G standards support

a. Limited internet browsing

b. Short messaging service

c. Both a) and b)

d. None of the above

ANSWER: c. Both a) and b)

64. The 2G GSM technology uses a carrier separation of

a. 1.25 MHz

b. 200 KHz

c. 30 KHz

d. 300 KHz

ANSWER: b. 200 KHz

65. 3G Cellular Networks

3G W-CDMA is also known as

a. UMTS

b. DECT

c. DCS-1800

d. ETACS

ANSWER: a. UMTS

66. Commonly used mode for 3G networks is

a. TDMA

b. FDMA

c. TDD

d. FDD

ANSWER: d. FDD

67. The minimum spectrum allocation required for W-CDMA is

a. 5MHz

b. 2MHz

c. 500KHz

d. 100KHz

ANSWER: a. 5MHz

68. CDMA2000 1xEV provides high speed data access with channel allocation of

a. 5MHz

b. 50 MHz

c. 1.25 MHz

d. 4MHz

ANSWER: c. 1.25 MHz

Satellite Networks

69. A television (TV) transmission is an example of which type of transmission?

a) Simplex

b) Half duplex

c) Full duplex

d) None of the above

70. INTELSAT stands?

a) **International Telecommunications Satellite**

b) India Telecommunications Satellite

c) Inter Telecommunications Satellite

d) None of the above

71. Kepler's first law states?

a) The path followed by a satellite around the primary will be an ellipse.

b) The path followed by a satellite around the primary will be an circle.

c) The path followed by a satellite around the primary will be an sphere

d) None of the above

72. Calculate the radius of a circular orbit for which the period is 1 day?

a) 42.241Km

b) 42.241m

c) 4.241Km

d) 2.241Km

73. Apogee?

a) The point farthest from earth

b) The point nearest from earth

c) The point smallest from earth

d) None of the above

74. Perigee?

a) The point farthest from earth

b) The point longest from earth

c) The point closest approach to earth

d) None of the above

75. Ascending node?

a) The point where the orbit crosses the equatorial plane going from south to north

b) The point longest from earth

c) The point closest approach to earth

d) None of the above

76. Argument of perigee?

a) The angle from ascending node to perigee, measured in the orbital plane at the earth's center, in the direction of satellite motion.

b) The point longest from earth

c) The point closest approach to earth

d) None of the above

77. The down link frequency in the C band transponder is

(A) 6 GHz **(B) 4 GHz**

(C) 14 GHz (D) 11 GHz

78. What is application of satellite systems?

a) whether forecasting

b) Terrestrial communication

c) point to point communication

d) None of the above

79. Mention the different services of satellite systems.

a) Broadcasting satellite services

b) Signal transmission

c) Information transmission

d) None of the above

80. What is meant by azimuth angle?

(a) It is defined as the angle produced by intersection of local horizontal plane & the plane passing through the earth station ,the satellite &center of earth.

(b) It is defined as the angle produced by intersection of local vertical plane & the plane passing through the earth station ,the satellite &center of earth.

(c) It is defined as the angle produced by intersection of local horizontal plane &center of earth.

(d) None of above

81. What is an attitude control system.

(a) It is the system that achieves & maintains the required attitudes. The main functions of attitude control system include maintaining accurate satellite position throughout the life span of the system.

(b) The main functions of attitude control system include maintaining accurate satellite velocity throughout the life span of the system.

(c) It is the system that achieves & maintains the required attitudes. The main functions of attitude control system include maintaining accurate satellite acceleration throughout the life span of the system.

(d) None of above

82. What is meant by transponder?

(a) In a communication satellite, the equipment which provides the connecting link between the satellite's transmit & receive antennas is referred to as the transponder.

(b) In a communication satellite, the equipment which provides the power supply is referred to as the transponder.

(c) a & b

(d) None of above

83. Primary component of uplink section of satellite is

a) transformer

b) transistor

c) earth station transmitter

d) power station transmitter

84. Sound signals in TV are

a) amplitude modulated

b) dc modulated

c) frequency modulated

d) a and c

85. Video signals in TV are

a) Amplitude modulated

b) de-modulated

c) Frequency modulated

d) None of these

86. With reference to satellite communication, the anti-jamming technique preferred is

a) key leverage

b) Frequency hopping

c) Once-only key

d) Frequency-spectrum modulation

87. In satellite communication modulation is used

a) AM

b) FM

c) PWM

d) PAM

88. FM is preferred for satellite communication because

a) Satellite channel has large bandwidth and severe noise

b) It give high modulation index

c) Low bandwidth is essentialiyrequerment

d) Non of the above

89. ARQ stands for

a) Accelerated redirection facility

b) Amplitude ratiodetector quantizing noise

c) Automatic repeat request

d) Aerial range quartz crystel

90. For globle communication, the minimum number of satellites needed is

a) 1

b) 3

c) 7

d) 11

91. The frequency band used by most satellites is

a) UHF

b) VHF

c) SHF

d) EHF

92. The total noise of a satellite earth station receiving system consists of

a) Sky noise

b) Antenna and feeder noise

c) Parametric amplifier noise

d) All of the above

93. The optimum working frequency for satellite systems lies between

a) 20 MHz and 100 MHz

b) 2 GHz and 12 GHz

c) 20 GHz and 100 GHz

d) 100 GHz and 200 GHz

94. Compander

a) Give a poor ratio of signal to duantizing error, for weaker signals

b) Give preferential treatment to stronger parts of the signal

c) **Compresses the higher amplitude parts of a signal before modulation and expand them back to normal again after demodulation**

d) None of the above

95. In TV broadcast via satellite the TV signal from the main broadcast station is routed to the earth station via

a) Low power transmitters

b) Microwave links

c) TV relay stations

d) Microwave repeater stations

96. A synchronous satellite orbits the earth once in

a) 24 hours

b) 12 hours

c) 6 hours

d) 1 hours

97. The velocity of a geostationary satellite is nearly

a) 1255 km/hr

b) 6757 km/hr

c) 9422 km/hr

d) 12644 km/hr

98. Geostationary satellites are located at a height of

a) 3600 km from earth's surface

b) 36000 km from earth's surface

c) 360,000 km from earth's surface

d) 3600,000 km from earth's surface

99. Geostationary satellite follow

a) Circular path

b) Elliptical path

c) Inclined path

100. The main advantage of satelliitecomminication is

a) Low cost

b) Low distortion

c) High reliability

d) High band width

101. A communication satellite is a repeater between

a) one transmitting and one receiving station

b) one transmitting and many receiving station

c) many transmitting and one receiving station

d) many transmitting and many receiving station

102. Primary source of power for satellite is

a) lead acid battery

b) nickel-cadmium battery

c) solar cells

d) regulated power supply

103. Which antenna is used for sending back signals from satellite to earth?

a) Dipole antenna

b) Horn antenna

c) Yagi antenna

d) Chicken-mash antenna

104. The uplink Frequency of C-band?

(a) 4GHz **(b) 6GHz**

(c) 8GHz (d) none of these

Radar Communication

105. Increasing the pulse width in a pulse radar

- increases resolution
- decreases resolution
- has no effect on resolution
- increases the power gain

Answer: decreases resolution

106. A high noise figure in a receiver means

- a poor minimum detectable signal
- a good detectable signal
- receiver bandwidth is reduced
- high power loss

Answer: a poor minimum detectable signal

107. The sensitivity of a radar receiver is ultimately set by

- a high S/N ratio
- a lower limit of signal input
- overall noise temperature
- a higher figure of merit

Answer: overall noise temperature

108. A RADAR that is used for measuring the height of an aircraft is known as

- radar altimeter
- radar elevator
- radar speedometer
- radar altitude

Answer: radar altimeter

109. Second-time-around echoes are caused by

- second-time reflection from target
- echoes returning from targets beyond the cathode tube range
- echoes that arrive after transmission of next pulse
- extreme ends of bandwidth

Answer: echoes that arrive after transmission of next pulse

110. The resolution of pulsed radars can be improved by

- increasing the pulse width
- decreasing pulse width
- increasing the pulse amplitude
- decreasing the pulse repetition frequency

Answer: decreasing pulse width

111. In case the antenna diameter in a radar system is increased to four times, the maximum range will be increased by

- 1/2 times

- 2 times
- 4 times
- 8 times

Answer: 4 times

112. The term RADAR stands for

- radio direction and reflection
- radio detection and ranging
- radio waves dispatching and receiving
- random detection and re radiation

Answer: radio detection and ranging

113. The gain of a radar transmitting antenna is

- less than that of a radar receiving antenna
- almost equal to that of a radar receiving antenna
- slightly higher than that of a radar receiving antenna
- much higher than that of a radar receiving antenna

Answer: almost equal to that of a radar receiving antenna

114. A large antenna is used in radars, because it

- gives higher gain
- gives lesser side lobes
- increases the beam width
- increases bandwidth

Answer: gives higher gain

115. A radar cross-section is affected by

- target size and shape
- target aspect
- target material and carrier frequency

- all of the above

Answer: all of the above

116. A radar range equation provides a relationship among

- received power
- target characteristics
- R_{max} of the radar, which is determined
- all of the above

Answer: all of the above

117. A radome is a

- radar housed in a dome
- protective cover for the antenna
- dish-shaped antenna
- dome-shaped antenna

Answer: protective cover for the antenna

118. The range of a radar can be increased by

- increasing the peak transmitted pulse power
- increasing the diameter of the antenna
- increasing the frequency
- any one of the above

Answer: any one of the above

119. In order to double the radar range, the peak pulse power should be increased

- 2 times
- 4 times
- 8 times
- 16 times

Answer: 16 times

Data Communication and Networking

120. The _______ is the physical path over which a message travels.

A. Protocol

B. Medium

C. Signal

D. All the above

121. The information to be communicated in a data communications system is the _______.

A. Medium

B. Protocol

C. Message

D. Transmission

122. Frequency of failure and network recovery time after a failure are measures of the _______ of a network.

A. Performance

B.Reliability

C. Security

D. Feasibility

123. An unauthorized user is a network _______ issue.

A. Performance

B. Reliability

C. Security

D. All the above

124. Which topology requires a central controller or hub?

A. Mesh

B. Star

C. Bus

D. Ring

125. Which topology requires a multipoint connection?

A. Mesh

B. Bus

C. Ring

D. Star

126. Communication between a computer and a keyboard involves ______________ transmission.

A. simplex

B. half-duplex

C. full-duplex

D. automatic

127. A television broadcast is an example of _______ transmission.

A. simplex

B. half-duplex

C. full-duplex

D. automatic

128. _______ connection provides a dedicated link between two devices.

A. point-to-point

B. multipoint

C. primary

D. secondary

129. In a _______ connection, more than two devices can share a single link.

A. point-to-point

B. multipoint

C. primary

D. secondary

130. In _______ transmission, the channel capacity is shared by both communicating devices at all times.

A. simplex

B. half-duplex

C. full-duplex

D. half-simplex

131. In the original ARPANET, _______ were directly connected together.

A. IMPs

B. host computers

C. networks

D. routers

132. This was the first network.

A. CSNET

B. NSFNET

C. ANSNET

D. **ARPANET**

133. Which organization has authority over interstate and international commerce in the communications field?

A. ITU-T

B. IEEE

C. **FCC**

D. ISOC

134. _______ are special-interest groups that quickly test, evaluate,and standardize new technologies.

A. **Forums**

B. Regulatory agencies

C. Standards organizations

D. All of the above

135. Which agency developed standards for physical connectioninterfaces and electronic signaling specifications?

A. **EIA**

B. ITU-T

C. ANSI

D. ISO

136. ______ is the protocol suite for the current Internet.

A. **TCP/IP**

B. NCP

C. UNIX

D. ACM

137. ______ refers to the structure or format of the data, meaning the order in which they are presented.

A. Semantics

B. **Syntax**

C. Timing

D. All of the above

138. ________ defines how a particular pattern to be interpreted, and what action is to be taken based on that interpretation.

A. **Semantics**

B. Syntax

C. Timing

D. None of the above

139. _______ refers to two characteristics: when data should be sent and how fast it can be sent.

A. Semantics

B. Syntax

C. **Timing**

D. none of the above

140. Data flow between two devices can occur in a _______ way.

A. simplex

B. half-duplex

C. full-duplex

D. **all of the above**

141. In a ______ connection, two and only two devices are connected by a dedicated link.

A. multipoint

B. **point-to-point**

C. (a) and (b)

D. none of the above

142. In a ________ connection, three or more devices share a link.

A. **multipoint**

B. point-to-point

C. (a) and (b)

D. none of the above

143. ______ refers to the physical or logical arrangement of a

network.

A. Data flow

B. Mode of operation

C. **Topology**

D. None of the above

144. Devices may be arranged in a _____ topology

A. mesh

B. ring

C. bus

D. **all of the above**

145. A _______ is a data communication system within a building, plant, or campus, or between nearby buildings.

A. MAN

B. **LAN**

C. WAN

D. none of the above

146. A ______ is a data communication system spanning states, countries, or the whole world.

A. MAN

B. LAN

C. **WAN**

D. none of the above

147. ________ is a collection of many separate networks

A. A WAN

B. **An internet**

C. a LAN

D. None of the above

148. There are ______________ Internet service providers.

A. local

B. regional

C. national and international

D. **all of the above**

149. A ________ is a set of rules that governs data communication.

A. forum

B. **protocol**

C. standard

D. none of the above