PHYSICS

BOOKS - TARGET PHYSICS (HINGLISH)

SEMICONDUCTORS

Classical Thinking

1. For a given solid, closely spaced energy levels of all electrons in a particular orbit is called

A. valence band

B. energy band

C. conduction band

D. band gap

Answer: B

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2. In insulators,

A. the valence band is partially filled with electrons.

B. the conduction band is partially filled with electrons.

C. the conduction band is filled with electrons and valence band is empty.

D. the conduction band is empty and the valence band is filled with electrons.

Answer: D

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3. The energy band gap is maximum in

A. metals

B. super conductors

C. insulators

D. semiconductors

Answer: C

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4. The band gap in Germanium and silicon in eV respectively is

A. 0.7,1.1

B. 1.1,0.7

C. 1.0,0

D. 0,1.1

Answer: A

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5. Metals are good conductors of heat as compared to the insulators because

A. they contain free electrons

B. their atoms are relatively far apart.

C. their atoms collide frequently.

D. they have reflecting surfaces.

Answer: A

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6. DISTINCTION BETWEEN CONDUCTORS, SEMICONDUCTOR AND INSULATORS

A. binding energy of free electrons

B. width of forbidden energy band.

C. work function of free electrons.

D. temperature coefficient of resistance.

Answer: B

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7. If the temperature of a semiconductor is increased, then the forbidden gap will

A. increase

B. remain same

C. decrease

D. vanish

Answer: C

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8. A hole in a semiconductors is rather different from an electron because it has

A. zero mass

B. positively charged vacancy

C. negatively charged particle

D. zero charge

Answer: B

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9. When suitable impurity is added to pure intrinsic semiconductor , the electrical conductivity _____.

A. increase its life

B. enable it to withstand higher voltages

C. increase its electrical conductivity.

D. increase its electrical resistivity.

Answer: C

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10. The donor atoms have energy level

A. slightly below the conduction band.

B. slightly above the conduction band.

C. slightly below the valence band.

D. slightly above the valence band.

Answer: A

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11. A pure semiconductors

A. has low resistance.

B. is an intrinsic semiconductor.

C. allows inadequate current to pass through it.

D. is an extrinsic semiconductor.

Answer: B

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12. In an intrinsic semiconductor

A. only electrons are responsible for flow of current.

B. both holes and electrons carry current.

C. both holes and electrons carry current with electrons being majority carries.

D. only holes are responsible for flow of current.

Answer: B

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13. Doping materials are called impurities because

A. they make semiconductors less pure.

B. they alter the crystal structure.

C. they change chemical properties.

D. they change the number of charge carriers.

Answer: B

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14. The most commonly used semiconductors are

A. germanium and silicon

B. germanium and copper

C. silicon and glass

D. glass and ebonite.

Answer: A

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15. At absolute zero temperature, a crystal of pure germanium

A. behaves as perfect conductor.

B. behaves as perfect insulator.

C. contains no electron.

D. contains no electron.

Answer: B

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16. The potential difference developed across the junction due to migration of majority carriers is called___.

A. Potential barrier

B. electric potential

C. gravitational potential

D. atomic potential

Answer: A

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17. Which of the following is NOT a 'donor' impurity?

A. Bismuth

B. Antimony

C. Indium

D. Arsenic

Answer: C

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18. Pure silicon should be doped with which of the following impurity atoms to make a p-type semiconductor?

A. Arsenic

B. Antimony

C. Aluminium

D. Germanium

Answer: C

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19. A n-type semiconductor is formed

A. when germanium crystal is doped with an impurity containing three valence electrons.

B. when germanium crystal is doped with an impurity containing five valence electrons.

C. from pure germanium

D. from pure silicon

Answer: B

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20. Regarding p-type and n-type semiconductors, which of the following statements is true?

A. n-type semiconductors have free electrons in majority.

B. n-type semiconductors have holes in majority.

C. The concentration of electrons and holes are equal in both n-type and p-type semiconductors.

D. n-type semiconductor is obtained by doping with trivalent impurity.

Answer: A

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21. Semiconductor is damaged by the strong current due to

A. excess of electrons

B. decrease in electrons

C. lack of free electrons

D. none of these

Answer: A

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22. Bond in n and p type semiconductor is

A. covalent

B. ionic

C. mettalic bond

D. co-ordinate bond

Answer: A

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23. In germanium crystal, a hole is provided by a _____ impurity.

A. covalent

B. trivalent

C. monovalent

D. Aluminium

Answer: B

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24. Which one of the following is an example of donor impurity?

A. Antimony

B. Indium

C. Silicon

D. Aluminium

Answer: A

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25. On doping germanium metal with a little amount of indium, one gets

A. a rectifier

B. an n-type semiconductor

C. an insulator

D. a p-type semiconductor

Answer: D

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26. The diode is called an electronic valve since

A. it permits the flow of electric current only in one direction from cathode to anode.

B. it permits the flow of electric current only in one direction from anode to cathode in external circuit.

C. it permits current in both directions.

D. it permits the flow of electric current in any direction.

Answer: A

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27. In a semiconductor diode, the barrier potential offers opposition to only

A. majority carriers in both regions.

B. minority carriers in both regions.

C. free electrons is n region.`

D. holes in the p region.

Answer: A

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28. In a p-n junction, there is no appreciable current if

A. p-section is made positive and n-section negative.

B. a potential difference is applied across junction making p-section negative and

n-section positive.

C. a potential difference is applied across the junction.

D. potential barrier is created at junction.

Answer: B

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29. Potential barrier developed in a junction diode opposes

A. minority carriers in both regions.

B. majority carriers.

C. electrons in n-region.

D. holes in p-region.

Answer: B

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30. When a p-n junction diode is forward biased, the flow of current across the junction is mainly.

A. due to drift of charges

B. due to diffusion of charges.

C. due to both drift and diffusion of charges.

D. due to charge-less particles.

Answer: A

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31. In p-n junction diode, holes diffuse from p-region to n-region because

A. the free electrons in the n-region attract them.

B. they are swept across the junction by potential difference.

C. there is a greater concentration of holes in p-region as compared to n-region.

D. there is great concentration of electrons in p-region as compared to n-region.

Answer: C

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32. The depletion layer in the p-n junction is caused by :-

A. drift of holes

B. diffusion of charge carriers.

C. migration of impurity ions.

D. drift of electrons.

Answer: B

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33. In a semiconductor diode, reserve bias current is due to drift of free electrons and holes caused by

A. impurity atoms

B. thermal excitation

C. crystal structure

D. battery

Answer: A

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34. A p-n junction diode is said to be forward biased when a potential difference applied across p and n region makes

A. p-region positive and n-region negative.

B. p-region negative and n-region positive.

C. both p and n-regions positive.

D. both p and n-regions negative.

Answer: A

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35. An ideal diode

A. should have zero resistance in the forward bias as well as in reverse bias.

B. should have zero resistance in the forward bias and an infinitely large resistance in reverse bias.

C. should have infinitely large resistance in the forward bias and zero resistance in reverse bias.

D. should have infinitely large resistance in forward as well as in reverse bias.

Answer: B

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36. A PN junction diode cannot be used

A. as a rectifier.

B. for converting light energy into electrical energy.

C. for getting light radiation.

D. for increasing the amplitude of an a.c, signal.

Answer: D

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37. when p-n junction is reverse biased, then the width of barrier potential will

A. increase and it will offer more resistance.

B. decrease and it will offer more resistance.

C. remain constant and it will not offer resistance.

D. decrease and it will offer less resistance.

Answer: A

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38. Leakage current in a junction diode

A. decreases with temperature.

B. increase with temperature.

C. is due to majority carrier.

D. depends on the biasing voltage.

Answer: B

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39. The process of converting alternating current into direct current is known as

A. rectification

B. amplification

C. magnification

D. modulation

Answer: A

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40. A diode rectifier

A. converts A.C. into D.C.

B. converts D.C. into A.C.

C. amplifies A.C. signals.

D. amplifies D.C. signals.

Answer: A

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41. To obtain full wave rectification, we require

A. only one diode

B. triode

C. two diodes

D. transistor

Answer: C

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42. Avalanche breakdown in a semi conductor diode occurs when

A. when potential barrier is reduced to zero.

B. when reverse bias exceeds a certain value.

C. when forward bias exceeds a certain value.

D. when forward current exceeds a certain value.

Answer: B

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43. A general purpose diode is more likely to suffer avalanche breakdown rather than zener breakdown because

A. it is heavity doped.

B. here covalent bands are weak.

C. it is lightly doped.

D. it is not doped.

Answer: C

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44. In a half wave rectifier, the r.m.s value of the A.C. component of the wave is

A. equal to D.C. value

B. more than D.C. value.

C. less than D.C. value.

D. zero

Answer: b

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45. A Zener diode

A. has negative temperature coefficient of resistance.

B. has sharp breakdown at low reverse voltage.

C. rectifies zener voltage.

D. works only in forward bias.

Answer: B

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46. When used in a circuit, Zener diode is always

A. forward biased

B. reverse biased

C. both forward and reverse.

D. connected inseries.

Answer: B

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47. symbol for photo-diode is

A. 

B. 

C. 

D. 

Answer: B

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48. Electron hole pairs are generated in a photodiode

A. when light enters in its depletion region.

B. when light enters in its junction.

C. when photon energy $hv > E_g$

D. (A) and (C)

Answer: D

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49. Photocurrent in a photodiode depends upon

A. biasing of junction.

B. no. of electron holes.

C. density of diode material.

D. intensity of incident radiation.

Answer: D

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50. Which of the following is NOT an application of photodiode?

A. Detection of optical signal

B. Objects counters

C. Optocouplers

D. Data profiting

Answer: D

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51. Usually Si is used in the designing of photodiodes because

A. it is poratble

B. it is easily available.

C. it requires less forward biasing

D. current due to thermally generated minority carriers is quite small.

Answer: D

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52. A solar cell can be made from

A. a thin wafer of Si doped with As.

B. a thin wafer of germanium.

C. a thin wafer of pure gallium arsenide.

D. a thin wafer of copper.

Answer: B

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53. A solar cell

A. converts the radiant energy of sun into electrical power.

B. converts the radiant energy of sun into heat.

C. reflects all the light from sun.

D. absorbs energy and converts into sound energy.

Answer: A

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54. Combination of solar cells designed to increase the electric power output is called

A. solar array

B. solar panels

C. solar module

D. all of these

Answer: D

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55. Solar cell produces photo voltage when incident light has energy.

A. equal to band gap energy.

B. greater than band gap energy.

C. less than band gap energy.

D. greater or equal to band gap energy.

Answer: B

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56. In LED, intensity of emitted light

A. increase with forward current.

B. decreases with forward current.

C. increases with reverse current.

D. decreases with reverse current.

Answer: A

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57. Which of the following diode emits red and yellow light?

A. Ga-As

B. Ga-As-P

C. Ga-P

D. As-P

Answer: B

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58. Colour of light emitted by LED depends upon

A. its reverse bias.

B. its forward bias.

C. type of semiconductor.

D. rectifier.

Answer: C

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59. Barrier potential in LED depends on type of

A. impurity

B. junction

C. biasing

D. semiconductors

Answer: D

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60. The brightness of LED can be controlled by

A. applied potential differences.

B. by changing the value of series resistance.

C. by changing the value of parallel resistance.

D. All of these

Answer: D

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61. In LED, to avoid damage to the diode_____ is used.

A. capacitor

B. resistor

C. insulator

D. conductor

Answer: B

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62. Choose the INCORRECT statement.

A. LEDs are cheap.

B. LEDs require high operating voltage.

C. LEDs have light weight.

D. LEDs have high operating speed.

Answer: B

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63. Barrier potential in Ga-As-P LED is about

A. 5 volt

B. 0.5 volt

C. 1.5 volt

D. 2.5 volt

Answer: C

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64. In a transistor with normal bias, the emitter base junction

A. has a high resistance.

B. has a low resistance.

C. is reverse biased.

D. is forward biased.

Answer: B

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65. Transistor consists of two junction diodes which are connected

A. one after another.

B. back to back

C. one across another.

D. one upon other.

Answer: B

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66. Transistor are essentially

A. power driven devices.

B. current driven devices.

C. voltage driven devices.

D. resistance driven devices.

Answer: B

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67. How many electrodes are there in a transistor ?

A. 2

B. 3

C. 4

D. 5

Answer: B

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68. The amplifier converts

A. A.C. into D.C. voltage.

B. D.C. into A.C. voltage.

C. low input signal to high output signal.

D. high input signal to low output signal.

Answer: C

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69. The arrow head on the transistor symbol always points in the direction of

A. flow of holes in the emitter region.

B. flow of electrons in the emitter region.

C. minority carriers flow in the emitter region.

D. majority carriers flow in the emitter region.

Answer: A

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70. In a transistor

A. length of emitter is greater than collector.

B. length of collector is greater than emitter.

C. length of base is greater than emitter.

D. length of base is greater than collector.

Answer: B

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71. In transistor the emitter current is.

A. slightly more than collector current .

B. slightly less than collector current.

C. equal to the collector current.

D. equal to the base current.

Answer: A

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72. In the working of n-p transistor, the number of free electrons which recombine with holes in the base layer is about.

A. 97% of the number injected into the base.

B. 50% of the number injected into the base.

C. 3% of the number of injected into the base.

D. 25% of the number injected into the base.

Answer: C

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73. The transistors provide good power amplification when they are used in

A. common collector configuration

B. common emitter configuration

C. common base configuration

D. any configuration.

Answer: B

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74. NPN and PNP bipolar transistors can be used as ON/OFF switch

A. for controlling high power devices.

B. for controlling low power devices.

C. for controlling A.C. in the circuit.

D. for controlling D.C. in the circuit.

Answer: D

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75. Transistors can work as a switch in

A. biasing region

B. cut off region

C. depletion region

D. none of these

Answer: B

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76. When a transistor is operated in the active region, it cannot be used

A. it cannot be used as CE amplifier.

B. it cannot be used as ON/OFF switch.

C. it cannot be used as an oscilator.

D. it cannot be used as a CB amplifier.

Answer: B

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77. Transistor switch possesses

A. high speed of operation.

B. low speed of operation.

C. neither high nor low speed of operation.

D. high opposition.

Answer: A

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78. Transistor switch is an essential component of

A. all digital circuits.

B. all electrical circuits.

C. every electronic device.

D. all electrical appliances.

Answer: A

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79. Generally an oscillator is nothing but an amplifier with a

A. negative feedback

B. positive feedback

C. large gain

D. positive or negative feedback.

Answer: B

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80. Find the 'wrong' component from the following. An electronic oscillator consists of

A. an amplifier

B. a tank circuit or oscillating circuit.

C. externally applied input signal.

D. feedback network.

Answer: C

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81. Undamped oscillation requires

A. rectifier,amplifier

B. rectifier, amplifier and feedback circuit.

C. turned circuit,amplifier and feedback circuit.

D. amplifier and feedback circuit.

Answer: C

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82. In negative feedback

A. phase difference is π.

B. phase difference is 2π.

C. phase difference is 0.

D. phase difference is $\frac{\pi}{2}$.

Answer: A

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83. In positive feedback, sample in phase has phase difference of

A. 270°

B. 180°

C. 90°

D. 360°

Answer: D

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84. In an oscillator, frequency of oscillations is given by

A. $v = 2\pi\sqrt{LC}$

B. $v = \dfrac{1}{2\pi\sqrt{LC}}$

C. $v = \frac{1}{2\pi\sqrt{C}}$

D. $v = \frac{1}{2\pi}\sqrt{LC}$

Answer: B

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85. Boolean algebra is essentially based on

A. symbol

B. logic

C. numbers

D. truth

Answer: B

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86. The Boolean expression for OR function is

A. Y=A+B

B. Y=A,B

C. Y=A-B

D. Y=A

Answer: A

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87. Which logic gate is similar to a function of two series switches?

A. AND gate

B. OR gate

C. NAND gate

D. XOR

Answer: A

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88. Logic gates are the building blocks of a :-

A. digital system

B. analog system

C. abacus system

D. communication system

Answer: A

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89. A combination of AND function and NOT function results in

A. OR gate

B. inversion

C. NAND gate

D. NOR gate

Answer: C

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90. An OR gate gives a logic 1 output

A. only when all inputs are logical 1.

B. only when any two inputs are logical 1.

C. when all inputs are logical 0.

D. when any one input is logical 1.

Answer: D

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91. In case of a semiconductor, which of the following statement is wrong?

A. Doping increases conductivity

B. Temperature coefficient of resistance is negative.

C. Resistivity is in between that of a conductor and insulator.

D. At absolute zero temperature, semiconductor behaves like a conductor.

Answer: D

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92. For a transistor, the current amplification factor is 4. when the transistor is connected in common emitter configuration, the change in collector current, when the base current changes by 6mA, is

A. 6mA

B. 4.8 mA

C. 24mA

D. 8mA

Answer: C

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Critical Thinking

1. The ratio of number of holes and number of conduction electrons in an intrinsic semiconductor is

A. One

B. Greater than one

C. Less than one

D. Infinity

Answer: A

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2. Let n_p and n_e be the number of holes and conduction electrons respectively in a semiconductor. Then

A. $n_p > n_e$ in an intrinsic semiconductor.

B. $n_p = n_e$ in an extrinsic semiconductor

C. $n_p = n_e$ in an intrinsic semiconductor.

D. $n_e > n_p$ in an intrinsic semiconductor

Answer: C

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3. Resistivity of pure germanium crystal at room temperature is in order of

A. 10^4

B. 10^3

C. 10^2

D. 10^1

Answer: C

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4. In a pure silicon $\left(n_i = 10^{16}/m^3\right)$ crystal at $300K$, 10^{21} atoms of phosphorus are added

per cubic meter. The new hole concentration will be

A. 10^{21} per m^3

B. 10^{19} per m^3

C. 10^{11} per m^3

D. 10^5 per m^3

Answer: C

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5. Germanium and silicon belong to the 4^{th} group of periodic table. Hence each atom of Ge or Si will have

A. two valence electrons

B. four valence electrons

C. three valence electrons

D. one valence electron.

Answer: B

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6. At room temperature, electrical conductivity of semiconductor is

A. greater than that of a good conductor.

B. zero

C. less than that of a good conductor

D. less than that of a bad conductor

Answer: C

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7. After doping, resistivity of a semiconductor

A. does not alter

B. increases

C. decreases

D. may increase or decrease depending on the dopant

Answer: C

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8. In a semiconductor diode p-side is earthed and N-side is applied a potential of -2V, the diode shall

A. conduct

B. not conduct

C. conduct partially

D. breakdown

Answer: A

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9. The electrical conductivity of a p-type semiconductor is determined by the number of

A. holes

B. valence electrons

C. electrons

D. conduction electrons

Answer: A

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10. A diode converts A.C. voltage into a/an

A. A.C. voltage with a different peak value.

B. D.C. voltage with a constant value.

C. bidirectional pulsating voltage with a constant r.m.s value.

D. undirectional pulsating voltage that keeps on dropping in between zero to maximum.

Answer: D

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11. The order of thickness of depletion region in p-n junction is

A. $10^{-12}m$

B. $10^{-6}m$

C. 1mm

D. 1 cm

Answer: B

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12. Ripple frequency at the output of bridge rectifier when the transformer primary is connected to A.C. mains supply is

A. 100 Hz

B. 50 Hz

C. 25 Hz

D. 75 Hz

Answer: A

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13. A zener diode has a breakdown voltage of 5 V with a maximum power dissipation of 240 mW. The maximum current the diode can handle will be

A. 50 mA

B. 48 mA

C. 10 mA

D. 8.33 mA

Answer: B

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14. In a zener regulator, if source voltage is 30 V, series resistance is of $1.5k\Omega$, load resistance is of $2k\Omega$ and V_z=10 V, the zener current will be

A. 13.33mA

B. 5 mA

C. 10 mA

D. 8.33 mA

Answer: D

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15. For obtaining maximum power from a solar cell, it should be operated in

A. knee portion of V-I characteristics

B. any portion of V-I characteristics

C. level part of V-I characteristics

D. falling part of V-I characteristics.

Answer: A

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16. A typical solar cell develops a voltage of about

A. 5 V

B. 10 V to 15 V

C. 0.5 V to 1 V

D. 0.5 mV

Answer: C

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17. LED constructed by silicon carbide, zinc selenide emit radiation of.....

A. blue colour

B. red colour

C. orange colour

D. brown colour

Answer: A

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18. npn transistors are preferred to pnp transistors because they have

A. low cost

B. low dissipation energy

C. capability of handling large power

D. electrons having high mobility than holes.

Answer: D

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19. If l_1, l_2, l_3 are the lengths of the emitter, base and collector of a transistor then

A. $l_1 = l_2 = l_3$

B. $l_3 < l_2 < l_1$

C. $l_3 < l_1 < l_2$

D. $l_3 > l_1 > l_2$

Answer: D

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20. Statement-1 : A transistor with common emitter mode has current gain 50. When base current is $5\mu A$, the emitter current is $0.255mA$.

Statement-2 : $I_e = I_b + I_c$

and $\beta = I_c / I_b$

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True,Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True,Reason is True,

D. Assertion is False but, Reason is True.

Answer: A

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21. In transistor, forward bias is always smaller than the reverse bias. The correct reason is

A. to avoid excessive heating of transistor

B. to maintain a constant base current.

C. to produce large voltage gain.

D. to provide high current.

Answer: A

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22. Current amplification factor in CE mode amplifier is 99. If the input base current is 20 microampere, the current through emitter is

A. $20\mu A$

B. $2000\mu A$

C. $1980\mu A$

D. $2020\mu A$

Answer: B

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23. In an NPN transistor the collector current is $24mA$. If 80% of electrons reach collector it base current in mA is

A. 36

B. 26

C. 16

D. 6

Answer: D

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24. In the case of constant α and β of a transistor

A. $\alpha = \beta$

B. $\beta < 1, \alpha > 1$

C. $\alpha\beta = 1$

D. $\beta > 1, \alpha < 1$

Answer: D

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25. Which is the 'wrong' statement from the following? In an electronic oscillator, the positive feedback voltage

A. increases the input voltage

B. is always in phase with the input voltage

C. is always in antiphase or 180° out of phase with the input voltage.

D. transfer a part of the output energy of the amplifier to the resonating L-C circuit.

Answer: C

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26. Electronic oscillator is better than mechanical one because

A. it has better frequency stability

B. it has higher efficiency

C. it has low frequency stability

D. it can produce frequency of 1 GHz.

Answer: A

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27. Ripple factor of a power suppply is a measure of

A. diode rating

B. filter efficiency

C. its voltage regulation

D. purity of power output.

Answer: D

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28. In positive logic, the logic state 1 corresponds to

A. negative voltage

B. zero voltage

C. its voltage regulation

D. purity of power output.

Answer: D

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29. How many NAND gates are required to form an AND gate ?

A. 2

B. 3

C. 4

D. 5

Answer: A

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30. Among the following which one gives output 1 in the AND gate.

A. $A = 0, B = 0$

B. $A = 0, B = 1$

C. $A = 1, B = 1$

D. $A = 1, B = 0$

Answer: C

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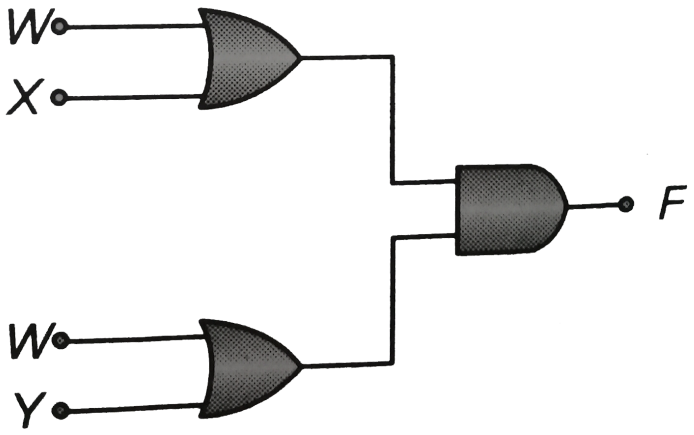
31. The diagram of a logic circuit is given below. The output F of the circuit is represented by



A. 

B. 

C. 

D. 

Answer: C

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32. Of the diodes shown in the following diagrams, which one is reverse biased?

A. 

B. 

C. 

D. 

Answer: C

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Competitive Thinking

1. Electrical conductivity of a semiconductor

A. decreases with the rise in its temperature.

B. increases with the rise in its temperature.

C. does not change with the rise in its temperature.

D. first increases and then decreases with the rise in its temperature.

Answer: B

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2. If the band gap between valence band and conduction band in a material is 5.0 eV, then the material is

A. semiconductor

B. good conductor

C. superconductor

D. insulator

Answer: D

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3. In a semiconductor,

A. there are no free electrons at any temperature.

B. the number of free electrons is more than that in a conductor.

C. there are no free electrons at O K.

D. none of these

Answer: C

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4. In a good conductor the energy gap between the conduction band and the valence band is

A. infinite

B. wide

C. narrow

D. zero

Answer: D

 Watch Video Solution

5. In insulators (C.B. is conduction band and V.B. is valence band)

A. V.B. is partially filled with electrons.

B. C.B. is partially filled with electrons.

C. C.B. is empty and V.B. is filled with empty.

D. C.B is filled with electrons and V.B is empty.

Answer: C

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6. The energy gap in case of which of the following is less than 3 eV?

A. Germanium

B. Iron

C. Copper

D. Aluminium

Answer: A

Watch Video Solution

7. Energy band in solids are a consequence of

A. Ohm's Law

B. Pauli's exclusion principle

C. Bohr's theory

D. Heisenberg's uncertainty principle.

Answer: B

Watch Video Solution

8. The band gap of an insulator, conductor and semiconductor are respectively E_{g1} and E_{g2} and E_{g3}. The relationship between them is given as_____.

A. $E_{g1} > E_{g2} > E_{g3}$

B. $E_{g1} > E_{g2} > E_{g3}$

C. $E_{g1} < E_{g2} < E_{g3}$

D. $E_{g1} < E_{g2} < E_{g3}$

Answer: A

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9. Three semi-conductor are arranged in the increasing order of their energy gap as follows. The correct arrangement is

A. Tellurium,germanium,silicon

B. Tellurium, silicon, germanium

C. Silicon, germanium, tellurium

D. Silicon, tellurium, germanium

Answer: A

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10. Assertion : The energy gap between the valence band and conduction band is greater in silicon than in germanium.

Reason : Thermal energy produces fewer minority carriers in silicon than in germanium.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False but, Reason is True.

Answer: B

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11. To a germanium sample, traces of gallium are added as an impurity. The resultant sample would behave like

A. a conductor

B. a P-type semiconductor

C. an N-type semiconductor

D. an insulator

Answer: B

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12. When phosphorus and antimony are mixed in germanium, then

A. p-type semiconductor is formed

B. n-type semiconductor is formed

C. both (A) and (B)

D. none of these

Answer: B

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13. Intrinsic semiconductor is electrically neutral. Extrinsic semiconductor having large number of current carriers is

A. positively charged

B. negatively charged

C. positively charged or negatively charged depending upon the type of impurity that has been added.

D. electically neutral

Answer: D

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14. In extrinsic semiconductors-

A. the conduction band and valence band overlap.

B. the gap between conduction band and valence band is more than 16 eV.

C. the gap between conduction band and valence band is near about 1 eV.

D. the gap between conduction band and valence band will be 100 eV and more.

Answer: C

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15. Serious draw back of the semiconductor device is

A. they cannot be used with high voltage.

B. they pollute the environment.

C. they are costly.

D. they do not last for long time.

Answer: A

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16. The density of an electron-hole pair in a pure germanium is $3 \times 10^{16} m^{-3}$ at room temperature. On doping with aluminium, the

hole density increases to $4.5 \times 10^{22} m^{-3}$. Now the electron density (in m^{-3}) in doped germanium will be

A. 1×10^{10}

B. 2×10^{10}

C. 0.5×10^{10}

D. 4×10^{10}

Answer: B

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17. A semiconductor has equal electron and hole concentration of $2 \times 10^{8} m^{-3}$. On doping with a certain impurity, the electron concentration increases to $4 \times 10^{10} m^{-3}$, then the new hole concentration of the semiconductor is

A. $10^{6} m^{-3}$

B. $10^{8} m^{-3}$

C. $10^{10} m^{-3}$

D. $10^{12} m^{-3}$

Answer: A

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18. The majority charge carriers in P -type semiconductor are

A. electrons

B. protons

C. holes

D. neutrons

Answer: C

Watch Video Solution

19. A P -type semiconductor can be obtained by adding

A. Arsenic to pure silicon

B. Gallium to pure silicon

C. Antimony to pure germanium

D. Phosphorus to pure germanium.

Answer: B

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20. P-type semiconductors are made by adding impurity element

A. As

B. P

C. B

D. Bi

Answer: C

Watch Video Solution

21. In a n-type semiconductor, which of the following statement is true?

A. Electrons are majority carriers and trivalent atoms are dopants.

B. Electron ar minority carriers and pentavalent atoms are dopants.

C. Holes are minority carriers and pentavalent atoms are dopants.

D. Holes are majority carriers and trivalent atoms are dopants.

Answer: C

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22. If n_e and n_h are the number of electrons and holes in a semiconductor heavily doped with phosphorus, then

A. $n_e > > n_h$

B. $n_e < < n_h$

C. $n_e \leq n_h$

D. $n_e = n_h$

Answer: A

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23. In n type semiconductor, electrons are majority charge carriers but it does not show any negative charge. The reason is

A. electrons are stationary.

B. electrons neutralize with holes.

C. mobility of electrons is extremely small.

D. atom is electrically neutral.

Answer: D

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24. When N-type of semiconductor is heated

A. number of electrons increases while that of holes decreases.

B. number of holes increases while that of electrons decreases.

C. number of electrons and holes remains same.

D. number of electrons and holes increases equality.

Answer: D

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25. PN-junction diode works as a insulator, if connected

A. to A.C

B. in forward bias

C. in reverse bias

D. to D.C

Answer: C

Watch Video Solution

26. With forward biased mode, the p-n junction diode

A. is one in which width of depletion layer increases.

B. is one in which potential barrier increases.

C. acts as closed switch.

D. acts as open switch.

Answer: C

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27. The forward biased diode comection is

A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

28. Which one of the following represents forward bias diode?

A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

29. In the following, reverse biased diode is.

A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

30. The barrier potential of a p-n junction depends on the (i)type of semiconductor material , (ii) amount of doping , (iii)temperature

which one of the following is correct ?

A. a and b only

B. b only

C. b and c only

D. a, b and c

Answer: D

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31. The dominant mechanism for motion of charge carriers in forward and reverse biased silicon p-n junction are

A. drift in forward bias, diffusion in reverse bias.

B. diffusion in forward bias, drift in reverse bias.

C. diffusion in both forward and reverse bias.

D. drift in both forward and reverse bias.

Answer: B

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32. Pick out the statement which is not true

A. At a low temperature, the resistance of a semiconductor is very high.

B. Movement of holes is restricted to the valence band only.

C. Width of the depletion region increases as the forward bias voltage increases in case of a p-n junction diode.

D. In a forward bias condition, the diode heavily conducts.

Answer: C

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33. Application of a forward bias to a p-n junction

A. increases the number of donors on the n-side.

B. increases the electric field in the depletion zone.

C. increases the potential difference across the depletion zone.

D. widens the depletion zone.

Answer: A

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34. The change in current through a junction diode is 1.2 mA when the forward bias voltage is changed by 0.6 V. The dynamic resistance is

A. 500Ω

B. 300Ω

C. 150Ω

D. 250Ω

Answer: A

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35. Which is the correct diagram of a half-wave reactifier?

A. 

B. 

C. 

D. 

Answer: B

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36. In a full wave rectifiers, input ac current has a frequency $'v'$. The output frequency of the current is

A. $\frac{v}{2}$

B. v

C. 2v

D. 320 Hz

Answer: C

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37. In a half wave rectifier the AC input source of frequency 50 Hz is used. The fundamental frequency of the output is

A. 50 Hz

B. 150 Hz

C. 200 Hz

D. 75 Hz

Answer: A

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38. Which of the following semi-conduting devices is used as voltage regulator?

A. LASER diode

B. Zener diode

C. Solar cell

D. Photo diode

Answer: B

 Watch Video Solution

39. Zener breakdown in a semi-conductor diode occurs when

A. forward current exceeds certain value

B. reverse bias exceeds certain value.

C. forward bias exceeds certain value.

D. Potential barrier is reduce to zero.

Answer: B

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40. Consider the folllowing statements i and ii and identify the correct choice of the given answers.

A zener diode is always connected in reverse bias.

The potential barrier of a p-n junction lies between 0.1 to 0.03 V approximately.

A. i and ii are correct

B. i and ii are wrong

C. i is correct but ii is wrong

D. i is wrong but ii is correct.

Answer: C

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41. Zener diode is used as

A. half wave rectifier.

B. full wave rectifier.

C. A.C. voltage stabilizer

D. D.C. voltage stabilizer

Answer: C

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42. Suppose an unregulated D.C. input voltage V_1 is applied to a Zener diode having breakdown voltage (V_z). Then the breakdown

condition for the diode to work as voltage regulator is

A. $V_1 < V_z$

B. $V_1 = V_z$

C. $V_1 > V_z$

D. $V_1 = \sqrt{V_z}$

Answer: C

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43. A zener diode having breakdown voltage 5.6 V is connected in reverse bias with a battery of emf 10 V and a resistance of 100Ω in series . The current flowing through the zener is.

A. 88 mA

B. 0.88 mA

C. 4.4 mA

D. 44 mA

Answer: D

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44. Photodiode is a device

A. which is always operated in reverse bias.

B. which is always operated in forward bias.

C. in which photo current is independent of intensity of independent radiation.

D. which may be operated in forward or reverse bias.

Answer: A

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45. In a p-n junction photocell, the value of photo-electromotive force produced by monochromatic light is proportional to

A. the voltage applied at the p-n junction.

B. the barrier voltage at the p-n junction.

C. the intensity of the light falling on the cell.

D. the frequency of the light falling on the cell.

Answer: C

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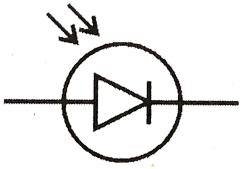
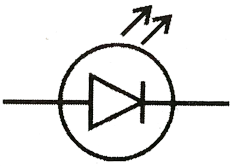
46. A light emitting diode is shown as

(1) 

(2) 

(3) 

(4) 

A.

B. 

C. 

D. 

Answer: B

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47. Assertion : Light emitting diode (LED) emits spontaneous radiation.

Reason : LED are forward biased p-n junctions.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False but, Reason is True.

Answer: A

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48. Generally, the base of a transistor has a thickness of the order of

A. $10^{-6}m$

B. $10^{-3}m$

C. 0.1 m

D. 1 cm

Answer: A

Watch Video Solution

49. A npn transistor conducts when

A. both collector and emitter are positive with respect to the base.

B. collector is positive and emitter is negative with respect to the base.

C. collector is psitive and emitter is at same potential as the base.

D. both collector and emitter are negative with respect to the base.

Answer: B

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50. When npn transistor is used as an amplifier, then

A. electrons move from base to collector.

B. holes move from emitter to base.

C. electrons move from collector to base.

D. holes move from base to emitter.

Answer: A

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51. In a CE amplifier, the input ac signal to be amplified is applied across

A. forward biased emitter-base junction.

B. reverse biased collector-base junction.

C. reverse biased emitter-base junction.

D. forward biased collector-base junction.

Answer: A

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52. In the three parts of a transistor, 'Emitter' is of

A. large size and lightly doped.

B. moderate size and heavily doped.

C. thin size and heavily doped.

D. large size and moderately doped.

Answer: B

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53. The part of a transistor which is heavily doped to produce a large number of majority carriers, is

A. base

B. emitter

C. collector

D. none of these

Answer: B

Watch Video Solution

54. In CE transistor amplifier, the collector junction has _____ bias and emitter junction has _____ bias.

A. reverse, reverse

B. forward, forward

C. reverse, forward

D. forward, reverse

Answer: C

Watch Video Solution

55. In a common emitter amplifier circuit using an n-p-n transistor, the phase difference between the input and the output voltages will be:-

A. 135°

B. 180°

C. 45°

D. 90°

Answer: B

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56. For a transistor, in a common emitter arragement, the alternating current gain β is given by

A. $\beta = \left(\frac{\Delta I_C}{\Delta I_B}\right)_{V_C}$

B. $\beta = \left(\frac{\Delta I_B}{\Delta I_C}\right)_{V_C}$

C. $\beta = \left(\frac{\Delta I_C}{\Delta I_E}\right)_{V_C}$

D. $\beta = \left(\frac{\Delta I_E}{\Delta I_C}\right)_{V_C}$

Answer: A

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57. For a transistor, α_{dc} and β_{dc} are the current ratios, then the value of $\frac{\beta_{dc} - \alpha_{dc}}{\alpha_{dc}. \beta_{dc}}$ is

A. 1

B. 1.5

C. 2

D. 2.5

Answer: A

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58. The value of current gain α of trasistor is 0.98. The value of β will be

A. 0.49

B. 49

C. 4.9

D. 5

Answer: B

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59. For a transistor, the current ratio $\alpha_{dc} = \frac{69}{70}$. The current gain β_{dc} is

A. 66

B. 67

C. 69

D. 71

Answer: C

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60. The value of β of a transistor is 19. The value of α will be

A. 0.93

B. 0.98

C. 0.99

D. 0.95

Answer: D

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61. If the current gain is 100, then the emitter current in a transistor for a base current of 5 mA, is

A. 0.505 A

B. 1.505 A

C. 2.505 A

D. 3.505 A

Answer: A

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62. For a common base configuration of PNP transistor $\frac{l_C}{l_E} = 0.98$, then maximum current gain in common emitter configuration will be

A. 12

B. 24

C. 6

D. 5

Answer: B

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63. In a PNP transistor working as common-base amplifier, current gain is 0.96 and current is $7.2mA$. The base current is

A. 0.4 mA

B. 0.2 mA

C. 0.29

D. 0.35 mA

Answer: C

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64. In a common emitter (CE) amplifier having a voltage gain G, the transistor used has transconductance 0.03 mho and current gain 25. If the above transistor is replaced with another one with transconductance 0.02 mho and current gain 20, the voltage gain will

A. $\frac{2}{3}G$

B. 1.5 G

C. $\frac{1}{3}G$

D. $\frac{5}{4}G$

Answer: A

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65. In common base circuit of a transistor, current amplification factor is 0.95. Calculate the emitter current, if base current is 0.2 mA.

A. 2 mA

B. 4 mA

C. 6 mA

D. 8 mA

Answer: B

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66. For a transistor the current amplification factor is 0.8. The transistor is connected in common emitter configuration. The change in the collector curren when the base current chages by a $6mA$ is

A. 6 mA

B. 4.8 mA

C. 24 mA

D. 8 mA

Answer: C

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67. In case of a bipolar transistor β =45. The potential drop across the collector resistance of 1 kΩ is 5 V. The base current is approximately

A. $222\mu A$

B. $55\mu A$

C. $111\mu A$

D. $45\mu A$

Answer: C

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68. In a common base amplifier circuit, calculate the change in base current, if that in the emitter current is 2 mA and $\alpha = 0.98$.

A. 0.04 mA

B. 1.96 mA

C. 0.98 mA

D. 2 mA

Answer: A

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69. In case of NPN-transistor the collector current is always less than the emitter current because

A. collector side is reverse biased and emitter side is forward biased.

B. after electrons are lost in the base and only remaining ones reach the collector.

C. collector side is forward biased and emitter side is reverse biased.

D. collector being reverse biased attracts less electrons.

Answer: B

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70. Assertion : In a common emitter transistor amplifier the input current is much less than the output current

Reason : The common emitter transistor amplifier has very high input impedance.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for

Assertion.

C. Assertain is True, Reason is False.

D. Assertion is False but, Reason is True.

Answer: C

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71. Consider an n-p-n transistor amplifier in common-emitter configuration. The current gain of the transistor is 100. If the collector

current changes by 1 mA, what will be the change in emitter current ?

A. 1.1 Ma

B. 1.01 mA

C. 0.01 mA

D. 10 mA

Answer: B

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72. In a N-P-N transistor about 10^{10} electrons enter the emitter in $2\mu s$, when it is connected to a battery. Then $I_E = ...\mu A$.

A. 200

B. 400

C. 800

D. 1600

Answer: C

Watch Video Solution

73. In a common base amplifier, the phase difference between the input signal voltage and output voltage is

A. 0

B. $\pi/4$

C. $\pi/2$

D. π

Answer: A

Watch Video Solution

74. In a common base mode of a transistor the collector current is 5.488 mA for an emitter current of 5.60 mA. The value of the base current amplification factor(β) will be

A. 50

B. 51

C. 48

D. 49

Answer: D

Watch Video Solution

75. In a transistor, the collector current varies by 0.49 mA and emitter current varies by 0.50 mA.

A. 49

B. 15

C. 99

D. 100

Answer: A

Watch Video Solution

76. In CE NPN transistor 10^{10} electrons enter the emitter in 10^{-6} s when it is connected to battery. About 5% electrons recombine with holes in the base. The current gain of the transistor is ..... . $\left(e = 1.6 \times 10^{-19} C\right)$

A. 0.98

B. 19

C. 49

D. 0.95

Answer: B

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77. The collector supply voltage in CE transistor amplifier is 10V. The base current is $10\mu A$ in the absence of the signal voltage and the voltage between the collector and the emitter is 4V. The current gain (β) of a transistor is 200, then the value of the load resistance R_1.....

A. $1k\Omega$

B. $2k\Omega$

C. $3k\Omega$

D. $4k\Omega$

Answer: C

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78. The minimum potential difference between the base and emitter required to switch a silicon transistor ON is approximately?

A. 1V

B. 3 V

C. 5 V

D. 4.2 V

Answer: A

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79. The input characteristics of a transistor in CE mode is the graph obtained by plotting

A. I_B against I_C constant V_{CE}

B. I_B against V_{BE} at constant V_{CE}

C. I_B against I_C at constant V_{BE}

D. I_B against V_{CE} at constant V_{BE}

Answer: B

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80. The input resistance of a common emitter transistor amplifier, if the output resistance is

$500k\Omega$, the current gain $\alpha = 0.98$ and the power gain is 6.0625×10^6 is

A. 198Ω

B. 300Ω

C. 100Ω

D. 400Ω

Answer: A

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81. The collector supply voltage is 6 V and the voltage drop across a resistor of 600 Ω in the collector circuit is 0.6 V, in a circuit of a transistor connected in common emitter mode. What is the base current if the current gain is 20?

A. 0.25 mA

B. 0.05 mA

C. 0.12 mA

D. 0.02 mA

Answer: B

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82. In a transistor if collector current is 25 mA and base current is 1 mA, then current amplification factor α is

A. $\frac{25}{24}$

B. $\frac{24}{25}$

C. $\frac{25}{26}$

D. $\frac{26}{25}$

Answer: C

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83. For a common-emitter transostor amplifier, the current gain is 60. If the emitter current is 6.6 mA then its base current is

A. 6.492 mA

B. 0.108 mA

C. 4.208 mA

D. 0.343 mA

Answer: B

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84. For CE transistor amplifier, the audio signal voltage across the collector resistance of $2k\Omega$ is 4V. If the current amplification factor of the transistor is 100 and the base resistance is $1k\Omega$, then the input signal voltage is

A. 15 mV

B. 10 mV

C. 20 mV

D. 30 mV

Answer: C

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85. A transistor is used as a common emitter amplifier with a load resistance $2K\Omega$. The input resistance is 150Ω. Base current is changed by $20\mu A$ which results in a change in

collector current by 1.5 mA. Thte voltage gain of the amplifier is

A. 900

B. 1000

C. 1100

D. 1200

Answer: B

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86. A change of 0.04 V takes place between the base and the emitter when an input signal is connected to the CE transistor amplifier. As a result, $20\mu A$ change takes place in the base current and a change of 2 mA takes place in the collector current. Find the input resistance and A.C. current gain

A. $2k\Omega, 100$

B. $1k\Omega, 100$

C. $2k\Omega, 200$

D. $1k\Omega, 200$

Answer: A

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87. A transistor is connected in CE configuration. In the collector circuit $V_{C.C} = 8V, RC = 800\Omega$. If the voltage drop across $R_C$is 0.5 V and $\alpha = 0.96,$ then I_C, V_{CE} and I_B will be

A. 0.625 mA, 7.5 V and 0.026 mA

B. 0.625 mA, 0.026 V and 7.5 mA

C. 1 mA, 8.5 V and 0.028 mA

D. 6.91 mA, 9.6 V and 0.29 mA

Answer: A

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88. The dc common emitter current gain of a n-p-n transistor is 50. The potential difference applied across the collector and emitter of a transistor used in CE configuration is,

$V_{CE} = 2V$. If the collector resistance, $R_C = 4\Omega$, the base current (I_B) and the collector current (I_C) are

A. $I_B = 10\mu A, I_C = 0.5mA$

B. $I_B = 0.5\mu A, I_C = 10mA$

C. $I_B = 5\mu A, I_C = 1mA$

D. $I_B = 1\mu A, I_C = 0.5mA$

Answer: A

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89. In an oscillator, for sustained oscillations, Barkhaused criterion is $A\beta$ equal to (A= voltage gain without feedback, β = feedback factor)

A. zero

B. $\frac{1}{2}$

C. 1

D. 2

Answer: C

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90. The voltage gain of an amplifier with 9% negative feedback is 10. The voltage gain without feedback will be

A. 1.25

B. 100

C. 90

D. 10

Answer: B

Watch Video Solution

91. The resonce frequency of the tank cuircuit of an oscillator when $L = \frac{1}{\pi^2} mH$ and $C = 0.04\mu F$ are connected in parellel is

A. 250 kHz

B. 25 kHz

C. 2.5 kHz

D. 25 MHz

Answer: B

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92. Which of following gates produces output of 1?

A. 

B. 

C. 

D. 

Answer: B

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93. The following truth table corresponds to the logic gate

A	0	0	1	1
B	0	1	0	1
X	0	1	1	1

A. NAND

B. OR

C. AND

D. XOR

Answer: B

Watch Video Solution

94. The logic behind $'NOR'$ gate is that it gives

A. high output when both the inputs are low.

B. low output when both the inputs are low.

C. high output when both the inputs are high.

D. low output when both the inputs are high.

Answer: A

95. Which logic gate produces LOW output when any of the inputs in HIGH

A. AND

B. OR

C. NAND

D. NOR

Answer: D

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96. The output of a $NAND$ gate is 0

A. if both inputs are 0.

B. if one input is 0 and the other input is 1.

C. if both inputs are 1.

D. either if both inputs are 1 or if one of the inputs is 1 and the other 0.

Answer: C

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97. Which gate can be obtained by shorting both the input terminals of a NOR gate.

A. OR

B. NOT

C. AND

D. NAND

Answer: B

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98. Assertion: $NAND$ or NOR gates are called digital building blocks.

Reason: The repeated use of $NAND$ (or NOR) gates can produce all the basic or complicated gates.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False but, Reason is True.

Answer: A

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99. When a semiconductor device is connected in series with a battery and a resistance a current is found to flow in the circuit. If however the polarity of the battery is reversed practically no current flows in the circuit. The device may be

A. a p-type semiconductor.

B. a n-type semiconductor.

C. an intrinsic semiconductor

D. a p-n junction.

Answer: D

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100. Which of the following statement is not true?

A. The resistance of an intrinsic semiconductor decreases with increase in temperature.

B. Doping pure Si with trivalent impurities gives p-type semiconductor.

C. The majority carriers in n-type semiconductors are holes.

D. A p-n junction can act as semiconductor diode.

Answer: C

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101. In Gallium arsenide material, Ohm's law does not hold good because

A. Current remains constant for any value of voltage.

B. Resistance is infinite

C. Negative resistance exists in the voltage-current variation.

D. Current goes to infinite at very low voltages.

Answer: C

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102. In a $p-n$ junction diode, change in temperature due to heating

A. affects only reverse resistance.

B. affects only forward resistance.

C. does not affect resistance of p-n junction.

D. affects the overall V-I characteristics of p-n junction.

Answer: D

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103. Assertion : The resistivity of a semiconductor increases with temperature.

Reason: In a conducting solid, the rate of collisions between free electrons and ions increases with increase of temperature.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False but, Reason is True.

Answer: D

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104. A wire of Aluminium and a wire of Germanium are cooled to a temperature of 770 K, Then

A. Resistance of each of them decreases.

B. Resistance of each of them increases.

C. Resistance of Aluminium wire increases and that of Germanium wire decreases.

D. Resistance of Aluminium wire decreases and that of Germanium wire increases.

Answer: D

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105. An LED is constructed from a p-n junction based on a certain semi-conducting material whose energy gap is 1.9 eV. Then, the wavelength of the emitted light is

A. $6.5 \times 10^{-7} m$

B. $2.9 \times 10^{-9} m$

C. $9.1 \times 10^{-5} m$

D. $1.6 \times 10^{-8} m$

Answer: A

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106. C and Si both have same lattice structure, having 4 bonding electrons in each. However, C is insulator whereas Si is intrinsic semiconductor. This is because

A. in case of C the valence band is not completely filled at absolute zero temperature.

B. in case of C the conduction band is partly filled even at absolute zero temperature.

C. the four bonding electrons in the case of C lie in the second orbit whereas in the case of Si, they lie in the third.

D. the four bonding electrons in the case of C lie in the orbit whereas for Si, they lie in the fourth orbit.

Answer: C

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107. In a zener diode, the reverse bias voltage is 3 V and the width of the depletion region is 300 A the electric field intensity will be ____ $\frac{V}{cm}$

A. 10^4

B. 10^6

C. 10^8

D. 10^{-2}

Answer: B

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108. Constant DC voltage is required from a variable AC voltage. Which of the following is correct order of operation?

A. Regulator, filter, rectifier

B. Rectifier, regulator, filter

C. Rectifier, filter,regulator

D. Filter, regulator,rectifier

Answer: C

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109. A n-p-n transisitor is connected in common emitter configuration in a given amplifier. A load resistance of 800Ω is

connected in the collector circuit and the voltage drop across it is $0.8V$. If the current amplification factor is 0.96 and the input resistance of the circuits is 192Ω, the voltage gain and the power gain of the amplifier will respectively be

A. 4,4

B. 4,3.69

C. 4,3.84

D. 3.69,3.84

Answer: C

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110. Identify the true statement of OR gate

A. Output Y will be 1 when the input A or B or both are 1

B. Output Y will be 0 when either of the inputs A and B is 1

C. Output Y will be 1 only when both the inputs A and B are 1

D. Output Y will be 1 only when either of the inputs A and B is 1

Answer: A

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Evaluation Test

1. Which of the energy band diagrams shown in the figure corresponds to that of a semiconductor?

A. 

B. 

C. 

D. 

Answer: D

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2. A zener-regulated power supply consists of a 9 V battery connected in series with a resistance of 100Ω and a zener diode. The

zener diode maintains a constant voltage drop of 4 V across a load resistance of 400Ω. The current drawn by the load resistance will be

A. 0.025 A

B. 0.050 A

C. 0.01 A

D. 0.015 A

Answer: C

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3. The current gain of a transistor is 0.94. The change in collector current corresponding to a change of 0.5 mA in the base current in A common emitter arrangement is

A. 1.52 mA

B. 2.38 mA

C. 3.45 mA

D. 7.83 mA

Answer: D

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4. For a photodiode, the forbidden energy gap (E_g) of the material used is 2.8 eV and wavelength of radiations (λ) incident on it is 5780 A. Then the emission of electrons is possible when incident radiation have.

A. λ=5780 A

B. $\lambda < 5780$ A

C. $\lambda > 5780$ A

D. none of these

Answer: B

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5. If the two ends p and n of p-n junction diode are joined by a wire,

A. there will not be a steady current in the circuit.

B. there will be a steady current from n-side to p-side.

C. there will be a steady current from p-side to n-side.

D. there will not be a current depending upon the resistance of the connecting wire.

Answer: C

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6. Assertion : A transistor amplifier in common emitter configuration has a low input impedance.

Reason : The base to emitter region is forward biased.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not be correct explanation of

assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: B

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7. Assertion : In a transistor the base is made thin.

Reason: A thin base makes the transistor stable.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not be correct explanation of assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: C

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8. Carbon, silicon and germanium have four valence electrons each. The most appropriate statement for these elements (at room temperature) is

A. Number of free electrons for conduction is significant in all three.

B. Number of free electrons for conduction is significant only in Si and Ge but small in C.

C. Number of free conduction electrons is significant in C but small in Si and Ge.

D. Number of free electrons is negligibly small in all three.

Answer: B

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9. The input resistance of a CE amplifier is 400Ω and the load resistance is $4k\Omega$. A change of base current by $10\mu A$ results in the

change of collector current by 2 mA. The voltage gain of the amplifier is

A. 500

B. 1000

C. 1500

D. 2000

Answer: D

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10. The number densities of electrons and holes in a pure germanium at room temperature are equal and its value is 2×10^{16} per m^3. On doping with aluminium the hole density increases to 3.5×10^{22} per m^3, then the electron density in doped germanium is

A. $1.1 \times 10^{10} m^{-3}$

B. $2.2 \times 10^{9} m^{-3}$

C. $3.3 \times 10^{9} m^{-3}$

D. $4.4 \times 10^{9} m^{-3}$

Answer: A

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11. For a transistor amplifier, the voltage gain

A. remains constant for all frequencies.

B. is high at high as well as low frequencies and constant in the middle frequency range.

C. is low at high and low frequency range.

D. none of these

Answer: C

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12. A common-emitter amplifier, has an input resistance of 500Ω and an output resistance of $40k\Omega$. If the current gain is 75, then power gain of the transistor is

A. 1.2×10^5

B. 2.3×10^5

C. 3.6×10^5

D. 4.5×10^5

Answer: D

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13. A p-n junction diode when forward biased has a drop of 0.4 V which is assumed to be independent of current. A current excess of 10

mA through the diode damages (burns) the diode. If we want to use a 2 V battery to forward bias the diode, what should be the value of resistor used in series with the diode so that the maximum current does not exceed 5 mA?

A. 130Ω

B. 260Ω

C. 390Ω

D. 320Ω

Answer: D

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14. A transistor has $\alpha = 0.96$. If the emitter current is 8 mA, what are the values of collector and base currents?

A. 7.8 mA, 0.5 mA

B. 7.7 mA, 0.3 mA

C. 7.6 mA, 0.2 mA

D. 7.5 mA, 0.1 mA

Answer: B

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15. In an n-p-n transistor 10^{10} electrons enter the emitter in 10^{-6} s, 3% of the electrons are lost in the base. The current transfer ratio is

A. 0.94

B. 0.95

C. 0.96

D. 0.97

Answer: D

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16. A transistor is connected in common-emitter (CE) configuration.The collector-supply is 10 V and the voltage drop across 500Ω in the collector circuit is 4 V. If the current-gain factor (α) is 0.96, the base-current is

A. 0.11 mA

B. 0.22 mA

C. 0.33 mA

D. 0.44 mA

Answer: C

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17. The maximum wavelength which a photodiode can detect with $E_g = 0.74$ eV is,

A. 1680 nm

B. 1764 nm

C. 1847 nm

D. 1932 nm

Answer: A

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