PHYSICS

BOOKS - MARVEL PHYSICS (HINGLISH)

SEMICONDUCTORS

Mcqs

1. What is the forbidden energy gap (in joule) for a Germanium crystal ?

A. 1.6×10^{-19}J

B. 1.12×10^{-19}J

C. 3.2×10^{-19}J

D. 2.24×10^{-19}J

Answer: B

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2. There is a small energy gap between the conduction and valence bands of

A. copper

B. silver

C. sodium

D. aluminium

Answer: C

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3. Copper and silicon is cooled from 300 K to 60 K, the specific resistance

A. increases in both Cu and Si

B. decreases in both Cu and Si

C. decreases in copper but increases in silicon

D. increases in copper but decreases in silicon

Answer: C

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4. Carbon , silicon and germanium have four valence elcectrons each . These are characterised by valence and conduction bands separated by energy band - gap respectively equal to $(E_g)_c (E_g)_{si}$ and $(E_g)_{Ge}$. Which of the following statements ture ?

A. $(E_g)_C = (E_g)_{\mathrm{Si}}$

B. $(E_g)_C < (E_g)_{\mathrm{Ge}}$

C. $(E_g)_C > (E_g)_{\mathrm{Si}}$

D. $(E_g)_C < (E_g)_{\mathrm{Si}}$

Answer: C

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5. The highest energy level which can be occupied by an electron in valence band at OK is known as

A. Potential energy

B. Ionisation energy

C. Fermi energy

D. Atomic energy

Answer: C

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6. At absolute zero , Si acts as

A. a metal

B. a non-metal

C. an insulator

D. none of these

Answer: C

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7. The difference in the variation of resistance with temperature in a metal and a semiconductor arises essentially due to the difference in the

A. crystal structure

B. variation of the number of charge carriers with temperature

C. type of bonding

D. variation of scattering mechanism with temperature

Answer: B

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8. Choose only the wrong statement from the following :

A. In conductors the valence and conduction bands may overlap

B. Substances withenergy gap of the order of 10 eV are insulators

C. The resistivity of a semiconductor increases with increase in temperature

D. The conductivity of a semiconductor increases with increase in temperature

Answer: C

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

A. zero

B. small but not zero

C. infinite

D. large but not infinite

Answer: A

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10. In an insulator

A. the valence band is partially filled with electrons

B. conduction band is partially filled with electrons

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

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

Answer: C

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11. A strip of copper and another of germanium are cooled from room temperature to 80 K. The resistance of

A. each of them decreases

B. each of them increases

C. Copper decreases and that of Germanium increases

D. Germanium decreases and that of Copper increases

Answer: C

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12. Carbon , silicon and germanium have four valence electrons each . At room temperature which one of the following statements is most appropriate ?

A. The number of free conductor electrons is negligibly small in all the three

B. The number of free electrons for conduction is significant in all the three.

C. The number of free electrons for conduction is significant only in Si and Ge but very small in C

D. The number of free conduction electrons is significant in C but small in Si and Ge

Answer: C

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13. The probability of electrons to be found in the conduction band of an intrinsic semiconductor at a finite temperature

A. increases expon entially with increasing band gap

B. decreases exponentially with increasing band gap

C. decreases with increasing temperature

D. is independent of the temperature and the band gap

Answer: B

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14. The level formed due to impurity atom, in the for hidden energy gap, very near to the valence band in a p-type semiconductor is called

A. Conduction Level

B. Forbidden Level

C. Donor Level

D. Acceptor Level

Answer: D

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15. The impurity atoms with which pure silicon should be doped to make a p - type semiconductor are those of

A. indium

B. Arsenic

C. Antimony

D. Phosphorus

Answer: A

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16. What is the change in resistance and electrical coductivity of a semiconductor, when its temperature is increased ?

A. increases, increases

B. decrease , decreases

C. decreases, increases

D. increases,decreases

Answer: C

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17. The forbidden energy band gap in conductors, semiconductors and insulators are EG_1, EG_2 and EG_3 respectively. The relation among them is

A. $G_1 = G_2 = G_3$

B. $G_1 > G_2 > G_3$

C. $G_1 < G_2 < G_3$

D. $G_1 < G_2 > G_3$

Answer: B

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18. How does potential barrier of a semiconductor vary with temperature?

A. 0.6 V

B. 0.8 V

C. 0.9 V

D. 0.4 V

Answer: D

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19. In a semiconductor, the energy gap between the valence and conduction bands is 1. 1 eV. It is expressed in joules as

A. 1.2×10^{-19} J

B. 1.76×10^{-19} J

C. 1.6×10^{-19} J

D. 3.2×10^{-19} J

Answer: B

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20. The mobility of mobile holes is less than that of mobile electrons because

A. holes are heavier than electrons

B. mobile electrons are in the conduction band , hence they are more energetic than holes

C. holes are positively charged

D. electrons experience lesser number of collisions than holes

Answer: B

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21. The electrical conductivity of pure silicon can be increased by

A. doping with acceptor impurities

B. doping with donor impurities

C. increasing its temperature

D. all the above

Answer: D

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22. Find the 'wrong' statement from the following : In a semiconductor

A. the number of free electrons increases with temperature

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

C. there are no free electrons at 0 K

D. there are no free electrons at any temperature

Answer: D

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23. The specimen of an intrinsic semiconductor contains 1.2×10^{15} holes/m^3. If it is doped by phosphorous atoms in a small proportion, then the number of holes/m^3 in the doped semiconductor will

A. slighty increase

B. slightly decrease

C. remain constant at 1.2×10^{15} holes/m^3

D. be doubled

Answer: C

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24. A conductor, an insulator, a semiconductor and an alloy are heated by $20^{\circ}C$ above the room temperature. Then there is an increase in the conductivity of the

A. Conductor

B. Semiconductor

C. Insulator

D. Alloy

Answer: B

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25. Which is the wrong statement from the following?

A. To get a p - type semiconductor, Si should be doped with a pentavalent impurity

B. Electrons are the majority carriers in an n-type semiconductor

C. A p-n junction is used in a rectifier

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

Answer: A

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26. In pure semiconductor, the number of conduction electrons is 6×10^{18} per cubic metre. How many holes are there in a sample of size 1 cm x 1 cm x 1 mm?

A. 6×10^{19}

B. 6×10^{15}

C. 6×10^{12}

D. 6×10^{10}

Answer: C

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27. A semiconductor is known to have an electron concentration of 6×10^{12} per cubic centimeter and a hole concentration of

8×10^{13} per cubic centimeter. Is this semiconductor N-type or P-type ?

A. a p-type semiconductor

B. an n-t ype semiconductor

C. an intrinsic semiconductor

D. either a p-type or an n-type semiconductor

Answer: A

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28. Choose the false statement from the following

A. The conductivity of a semiconductor increase with increase in temperature

B. In conductors the valence and conduction bands overlap in most of the cases

C. Substances with energy gap of the order of 10 eV are insulators

D. The resistivity of a semiconductor increases with increase in temperature

Answer: D

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29. When the conductivity of a semiconductor is only due to breaking of covalent bonds, the semi conductor is called.

A. Donor

B. Acceptor

C. Intrinsic

D. Extrinsic

Answer: C

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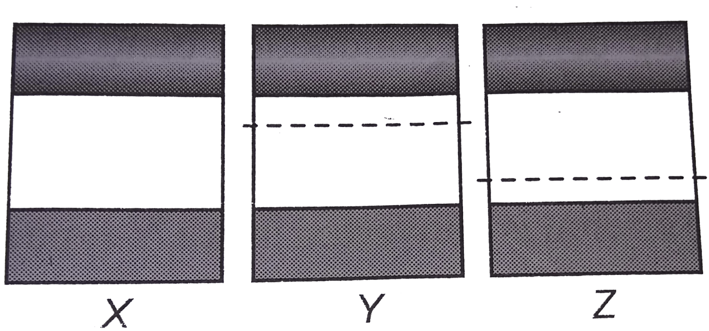
30. The energy band diagrams for three semiconductor samples of silicon are as shown. We can then assert that



A. Sample X is undoped while samples Y and Z have been doped with a third group and a fifth group impurity respectively

B. Sample X is undoped while both samples Y and Z have been doped with a fifth group impurity

C. Sample X has been doped with equal amounts of third and fifth group impurities while samples Y and Z are undoped

D. Sample X is undoped while samples Y and Z have been doped with a fifth group and a third group impurity respectively

Answer: D

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31. 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, it behaves like a conductor

Answer: D

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32. Intrinsic semiconductor is electrically neutral. Extrinsic semiconductor having large number of current carriers would be

A. Positively charged

B. Negatively charged

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

D. Electrically neutral

Answer: D

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33. The maximum wavelength of electromagnetic radiation, which can create a hole-electron pair in germanium. (Given that forbidden energy gap in germanium is 0.72 eV)

A. 172220 Å

B. 172.2 Å

C. 17222 Å

D. 1722Å

Answer: C

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34. In a pure silicon $(n_i = 10^{16} / m^3)$ crystal at $300K$, 10^{21} atoms of phosphorus are added per cubic meter. The new hole concentration will be

A. 10^{19} per m^3

B. 10^{11} per m^3

C. 10^{5} per m^3

D. 10^{21} per m^3

Answer: B

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35. There are two Ge crystals A and B. Few aluminium atoms are added to A while few Indium atoms are added to B. Then

A. both of them will become n-type semiconductors

B. A will be a p-type semiconductor and B will be an n-type semiconductors

C. both of them will become p-type semiconductors

D. B will become p-type and A will become n-type semiconductor

Answer: C

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36. By increasing the temperature, the specific resistance of a conductor and a semiconductor

A. increases for both

B. decreases for both

C. increases, decreases

D. decreases, increases

Answer: C

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37. In semiconductors at a room temperature

A. the valence band is completely filled and the conduction band is partially filled

B. the valence band is completely filled

C. the conduction band is completely empty

D. the valence band is partially empty and the conduction band is partially filled

Answer: D

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38. Which of the following , when added as an impurity, into the silicon, produces n-type semiconductor ?

A. Phosphorus

B. Aluminium

C. Magnesium

D. Both (b) and (c)

Answer: A

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39. A semiconductor has phosphorus as impurity, then it will have

A. $n_e = n_h$

B. $n_e > > n_h$

C. $n_e < < n_h$

D. $n_e = \frac{1}{2} n_h$

Answer: B

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40. The conductivity of a semiconductor increases with increase in temperature because

A. increase its conductivity

B. decrease its conductivity

C. not affect its conductivity

D. reduce its conductivity to zero

Answer: A

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41. In a P -type semi-conductor, germanium is dopped with

A. Boron

B. Indium

C. Aluminium

D. all of these

Answer: D

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42. Carbon , silicon and germanium have four valence elcectrons each . These are characterised by valence and conduction bands separated by energy band - gap respectively equal to $(E_g)_c (E_g)_{si}$ and $(E_g)_{Ge}$. Which of the following statements ture ?

A. n - intrinsic-p

B. p - intrinsic- n

C. intrinsic-p -n

D. intrinsic-N-p

Answer: D

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43. The electrical conductivity of a semiconductor increases when electromagnatic radiation of wavelength shorter than 2480 nm is incident on it. Find the band gap of the semiconductor. Given $h = 6.63 \times 10^{-34} Js, \text{ and } 1eV = 1.6 \times 10^{-19} J$

.

A. 0.9 eV

B. 1.2 eV

C. 1.8 eV

D. 0.5 eV

Answer: D

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44. In the energy band diagram of a material shown below, the open circles and filled circles denote holes and electrons respectively. The material is

A. an insulator

B. a metal

C. an n-type semiconductor

D. a p-type semiconductor

Answer: D

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45. A silicon specimen is made into a P-type semiconductor by dopping, on an average, one helium atoms per 5×10^7 silicon atoms. If the number density of atoms in the silicon specimen is $5 \times 10^{28} atom / m^3$ then the number of acceptor atoms in silicon per cubic centimeter will be

A. $3 \times 10^{15} \mathrm{atom/cm}^3$

B. $1 \times 10^{15} \mathrm{atom/cm}^3$

C. $3 \times 10^{18} \mathrm{atom/cm}^3$

D. $1 \times 10^{21} \mathrm{atom/cm}^3$

Answer: B

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46. The energy gap of silicon is $1.14 eV$. The maximum wavelength at which silicon will begin absorbing energy is

A. 1086 Å

B. 10860 Å

C. 10.86 Å

D. 108.6 Å

Answer: B

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47. A Ge specimen is dopped with Al. The concentration of acceptor atoms is ~$10^{21} atoms / m^3$. Given that the intrinsic concentration of electron hole pairs is

~$10^{19}/m^3$, the concentration of electron in the speciman is

A. $10^{17}/m^3$

B. $10^{15}/m^3$

C. $10^{4}/m^3$

D. $10^{2}/m^3$

Answer: A

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48. if n_e and v_d be the number of electrons and drift velocity in a semiconductor. When the temperature is increased.

A. n_e increases and v_d decreases

B. n_e decreases and v_d increases

C. Both n_e and v_d increases

D. Both n_e and v_d decreases

Answer: A

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49. When a potential difference is applied across, the current passing through

A. an insulator at 0 K is zero

B. a semiconductor at 0 K is zero

C. a metal at 0 K is zero

D. a reverse biased p-n junction diode at 300 K is finite

Answer: C

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50. A P-type sillicon semiconductor is made by adding one atom of indium per 5×10^7 atoms of sillicon. If the number density of silicon is $25 \times 10^{28} \mathrm{atom} / m^3$. Point the number of acceptor atoms in per cubic cm. of sillicon

A. 10^{15}

B. 1.5×10^{15}

C. 2×10^{15}

D. 2.5×10^{15}

Answer: C

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51. Pure Si at $500K$ has equal number of electron (n_e) and hole (n_h) concentration of $1.5 \times 10^{16} m^{-3}$. Dopping by indium. Increases n_h to $4.5 \times 10^{22} m^{-3}$. The doped semiconductor is of

A. n-type withelectron concentration

$$n_e = 2.5 \times 10^{23} m^{-3}$$

B. p-type having electron concentration

$n_e = 5 \times 10^9 m^{-3}$

C. n-type withelectron concentration

$n_e = 5 \times 10^{22} m^{-3}$

D. p-type with electron concentration

$n_e = 2.5 \times 10^{10} m^{-3}$

Answer: B

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52. When a battery is connected to a P-type semiconductor with a metallic wire, the current in the semiconductor (predominantly), inside the metallic wire and that inside the bettery respectively due to

A. Holes, ions, electrons

B. Ions, electrons, holes

C. Electrons, ions, holes

D. Holes, electrons, ions

Answer: D

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53. If the ratio of the concentration of electron to that of holes in a semiconductor is $\frac{7}{5}$ and the ratio of current is $\frac{7}{4}$ then what is the ratio of their drift velocities ?

A. $\frac{5}{4}$

B. $\frac{4}{7}$

C. $\frac{5}{8}$

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

Answer: A

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54. A semiconducting device is connected in a series circuit with a battery and a resistance.A current is found to pass through the circuit .If the polarity of the battery is reversed, the current drops to almost zero.The device may be

A. an intrinsic semiconductor

B. n type semiconductor

C. p type semiconductor

D. a p-njunction

Answer: D

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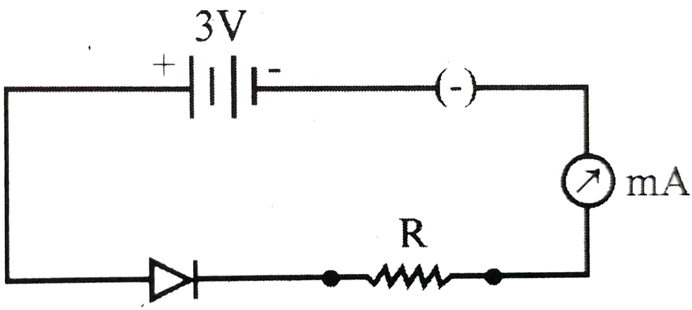

55.

In the above circuit, the voltage drop across the resistance (R) is

A. 3V

B. 2V

C. 2.4V

D. 1V

Answer: C

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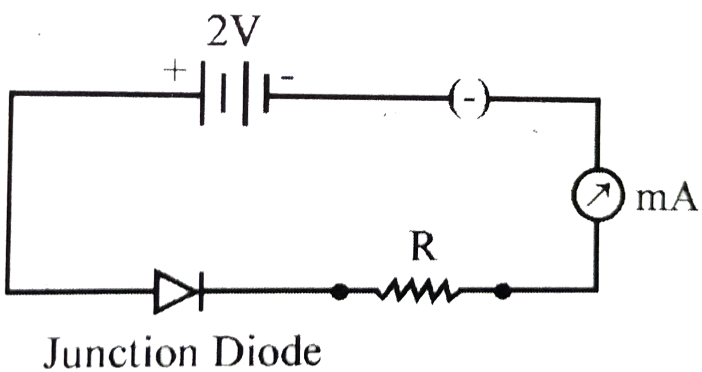
56. Some current is flowing in the milli ammeter in the following circuit. If the applied voltage is increased from 2 V to 4 V, then



A. the p.d. across the resistance R decreases

B. the p.d. across the diode increases

C. the p.d. across the diode remains constant

D. the current in the milliammeter is doubled

Answer: C

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57. When the forwward bias voltage of a diode is changed from 0.6 V to 0.7 V the current changes from 5 mA to 15 mA. Then its forward bias resistance is

A. 100 Ω

B. 200 Ω

C. 300 Ω

D. 400 Ω

Answer: C

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58. A half-wave rectifier is being used to rectify an alternating voltage of frequency 50 Hz. The number of pulses of rectified current obtained in one second is

A. 30

B. 120

C. 60

D. 90

Answer: C

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59. Which of the following diodes is forward-biased ?

A. 4

B. 2

C. 3

D. 1

Answer: B

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60. In which one of the following devices the reverse biased characteristics of a p-n junction diode are used?

A. Amplifier

B. Zener diode

C. Oscillator

D. Logic gate

Answer: B

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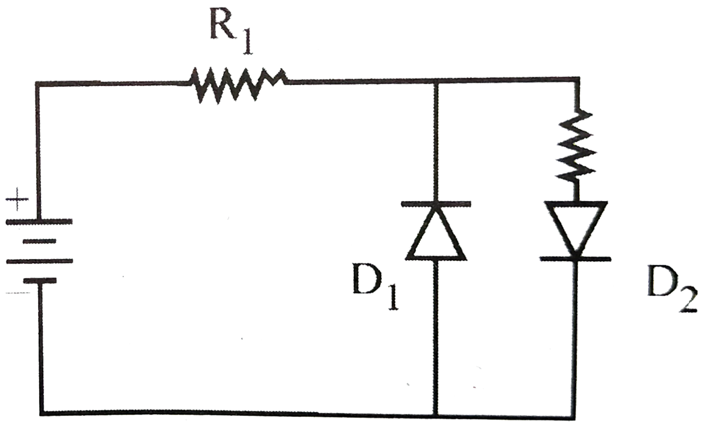
61. In the following circuit



A. D_1 and D_2 are forward biased

B. D_1 and D_2 are reverse biased

C. D_2 is forward biased and D_1 is reverse biased

D. D_2 is reverse biased and D_1 is forward biased

Answer: C

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62. If the forward voltage in a semiconductor diode is chaged form 0.5 V to 2 V, then the forward current changed by 1.5 mA. The forward resistance of diode will be-

A. 50 Ω

B. 100 Ω

C. 150 Ω

D. 200 Ω

Answer: D

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63. The depletion region of a p - n junction is formed

A. when it is forward biased

B. when it is reversed biased

C. during the process of its manufacture

D. when its temperature is decreased

Answer: C

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64. In half - wave rectification, what is the output frequency, if the input frequency is 50 Hz ? What is the output frequency of a full - wave rectifier for the same input frequency ?

A. 50 Hz

B. 100 Hz

C. 25 Hz

D. 75 Hz

Answer: B

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65. When the resistance between p and n regions is very high then the p-n junction diode acts as

A. an inductor

B. a transistor

C. a capacitor

D. zener diode

Answer: C

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66. In a p - n junction, electric conduction takes place due to

A. drift

B. diffusion

C. drift and diffusion

D. barrier potential

Answer: C

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67. The current obtained from a simple filterless reactifier is

A. an eddy current

B. sinusoidal current

C. varying direct current

D. constant direct current

Answer: C

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68. In the case of a p-n junction diode, if the reverse bias is very high, there is a sudden large increase in current. In this case the value of reverse bias voltage is known as

A. Cutoff voltage

B. Critical voltage

C. Knee voltage

D. Zener voltage

Answer: D

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69. What happens to the depletion region of a p-n junction ?

A. Decreases if reverse biased

B. Increases if reverse biased

C. Increases if forward biased

D. Remains the same in reverse and forward biasing

Answer: B

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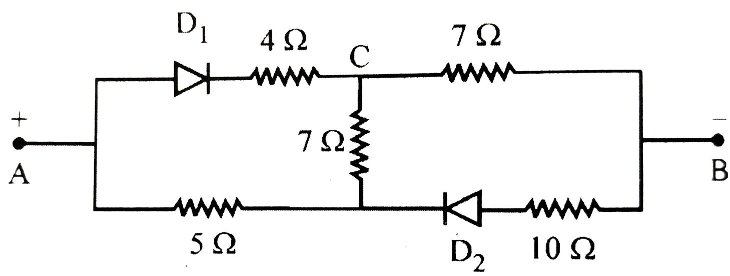
70. What is the resistance of the diode circuit between A and B. (D_1 and D_2 are ideal diodes)



A. 7 Ω

B. 8 Ω

C. 9 Ω

D. 10 Ω

Answer: D

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71. In a p-n junction, the thickness of the depletion region is 10^{-5} m. What is the P.D. that should be applied across it, to produce an electric field of intensity 10^5 V /m ?

A. 0.5 V

B. 0.75 V

C. 1 V

D. 1.25 V

Answer: C

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72. A potential barrier of 0.3 V exists across a p-n junction. If the depletion region is 1 μm wide, what is the intensity of electric field in this region?

A. 3 μm

B. 5 μm

C. 7 μm

D. 4 μm

Answer: B

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73. The potential barrier of a semiconductor is 0.6 Vat room temperature. What is the approximate value of its potential barrier, if the temperature is increased by $20^\circ C$?

A. 0.7V

B. 0.8V

C. 1.00 V

D. 0.5V

Answer: D

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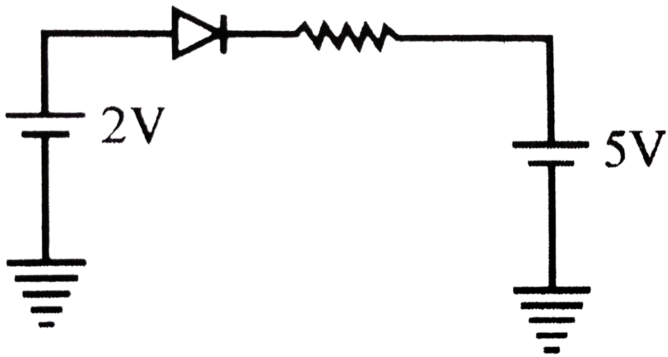
74. The current through the diode in the given circuit is



A. 1 mA

B. 10 mA

C. 5 mA

D. zero

Answer: D

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75. When the P end of $P-N$ junction is connected to the negative terminal of the battery and the N end to the positive terminal then diode behaves as

A. a super conductor

B. an insulator

C. a semiconductor

D. a conductor

Answer: B

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76. The electrical circuit used to get smooth dc output from a rectifier circuit is called

A. an oscillator circuit

B. a filter circuit

C. an amplifier circuit

D. a logic gate

Answer: B

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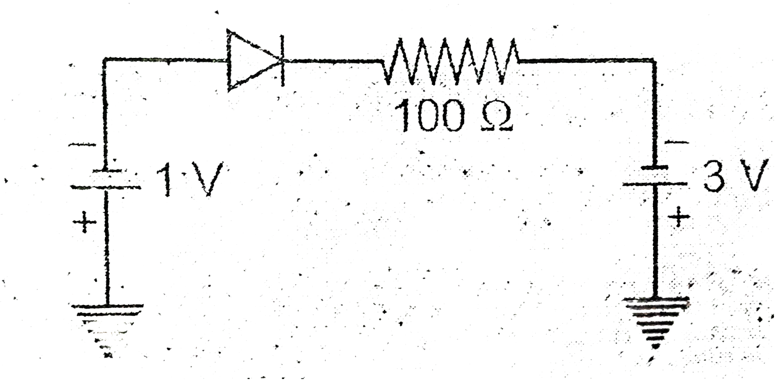
77. What is the current through an ideal p-n junction diode shown in figure below ?



A. Zero

B. 10 mA

C. 20 mA

D. 50mA

Answer: C

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78. What is the current in the following diode circuit?

A. $0A$

B. $10^{-2}A$

C. $1A$

D. $0.10A$

Answer: A

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79. The depletion layer in $P-N$ junction region 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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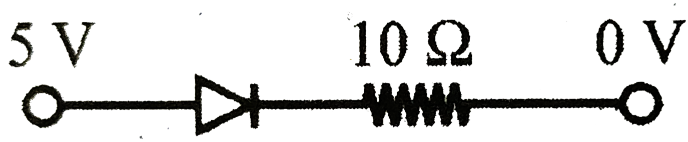
80. A junction diode has a resistance of 25 Ω when forward biased and 2500 Ω when reverse biased. What is the current in the diode, for the arrangement shown ?



A. $\frac{1}{25}A$

B. $\frac{1}{7}A$

C. $\frac{1}{35}A$

D. $\frac{1}{480}A$

Answer: B

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81. When forward bias is applied to a $P-N$ junction, then what happence to the potential barrier V_B, and the width of charge depleted region x?

A. V_B increases, x decreases

B. V_B decreases, x increases

C. V_B increases, x increases

D. V_B decreases, x decreases

Answer: D

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82. In an unbiased p-n junction,

A. p and n both are at same potential

B. high potential at n side and low potential at p-side

C. high potential at p side and low, potienial at n side

D. low potential at n side and zero potential at p side

Answer: B

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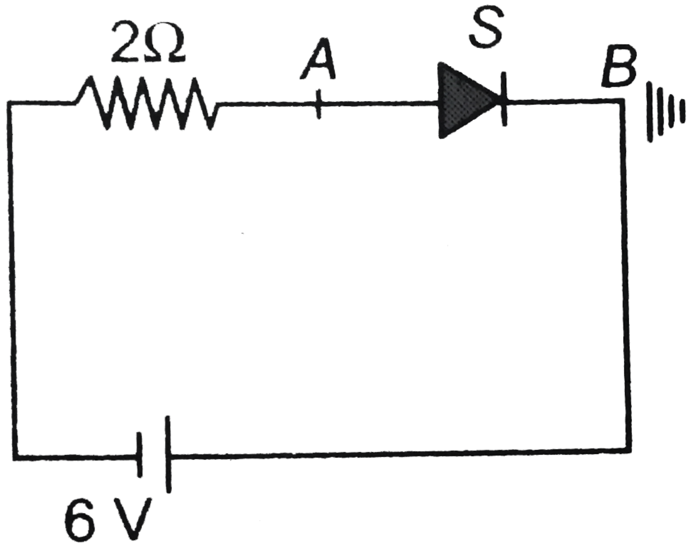
83. The diode shown in the circuit is a silicon diode. The potential difference between the points A and B will be



A. 6 V

B. 0.6 V

C. 0. 7 V

D. 0 V

Answer: A

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84. A diode having potential difference $0.5V$ across its junction which does not depend on current, is connected in series with resistance of 20Ω across source. If $0.1A$ passes through resistance then what is the voltage of the source?

A. 1.5 V

B. 2.0 V

C. 2.5 V

D. 5 V

Answer: C

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85. In a reverse biased diode, when the applied voltage changes by $1V$, the current is found to change by $0.5\mu A$. The reversebiase resistance of the diode is

A. $2 \times 10^5 \Omega$

B. $2 \times 10^6 \Omega$

C. 200Ω

D. 2Ω

Answer: B

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86. Barrier potential of a $p-n$ junction diode does not depend on

A. Temperature

B. Diode design

C. Forward and reverse biasing

D. Doping density

Answer: B

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87. When $p - n$ junction diode is forward biased then

A. the depletion region is reduced and barrier height is increased

B. the depletion region is widened and barrier height is reduced

C. both the depletion region and barrier height are reduced

D. both the depletion region and barrier height are increase

Answer: C

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88. If a full wave rectifier circuit is operating from $50Hz$ mains, the fundamental frequency in the ripple will be

A. 100 Hz

B. 25 Hz

C. 59 Hz

D. 70.7 Hz

Answer: A

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89. Application of a forward biase to a $p-n$ junction:

A. increases the potential differences across the depletion zone

B. widens the depletion zone

C. increases the electric field in the depletion zone

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

Answer: D

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90. The barrier potential of a $p-n$-junction depends on

(i) Type of semiconductor material

(ii) Amount of doping

(iii) Temperature

which of the following is correct?

A. (ii) and (iii) only

B. (i),(ii) and (iii)

C. (i) and (ii) only

D. (ii) only

Answer: B

Watch Video Solution

91. A recutifier is used to

A. convert dc to ac

B. amplify a weak signal

C. convert ac to dc

D. generate intermitter voltage

Answer: C

Watch Video Solution

92. Freuency of given AC signal is 50 Hz. When it connected to a half - wave rectifier, then what is the number of output pulses given by rectifier within one second ?

A. 25

B. 150

C. 100

D. 50

Answer: D

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93. The depletion layer in a p-n junction diode is 10^{-6} m wide and its knee potential is 0.5 V, then the inner electric field in the depletion region is

A. 5×10^{-7} V/m

B. 5×10^{5} V/m

C. 5×10^{-1} V/m

D. 5×10^{6} V/m

Answer: B

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94. A semiconducting device is connected is series with a battery, a resistance and a microammeter. It is found that there is practically no current in the circuit. But if the polarity of the battery is reversed, there is a sudden increase in the current. The device may be

A. a p-type semiconductor

B. an intrinsic semiconductor

C. an n-type semiconductor

D. a p-n junction diode

Answer: D

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95. The dominant mechanisms for motion of charge carriers in forward and reverse biased silicon $P - N$ junction are

A. Drift in forward bias and diffusion in reverse bias

B. Diffusion in forward bias and drift in reverse bias

C. Drift in both forward and reverse bias

D. Diffusion in both forward and reverse bias

Answer: B

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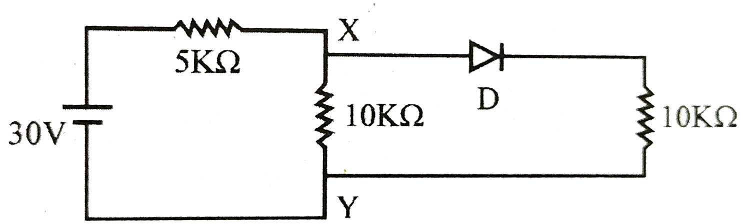
96. For the diode D, the forward resistance is zero and the backward resistance is infinite. It is connected in a D.C. circuit as shown in the figure. The potential difference between X and Y is



A. 5 V

B. 10 V

C. 15 V

D. 20 V

Answer: C

Watch Video Solution

97. In the middle of the depletion layer of a reverse - biased $p-n$ junction , the

A. potential is zero

B. electric field is maximum

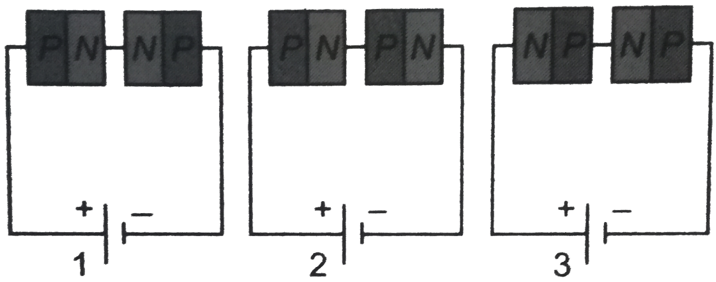
C. potential is maximum

D. electric field is very very small

Answer: D

Watch Video Solution

98. Two PN-junction can be connected in series by three different methods as shown in the figure. If the potential difference in the junction is the same, then the correct connection will be



A. In the circuit (1) and (2)

B. In the circuit (2) and (3)

C. In the circuit (1) and (3)

D. Only in the circuit (1)

Answer: B

Watch Video Solution

99. In a p- n junction diode not connected to any circuit,

A. The potential is the same everywhere

B. The p-type is at a higher potential than the n-type side

C. There is an electric field at the junction which is directed from the n-type side to the p-type side

D. There is an electric field at the junction which is directed from the p-type side to the n-type side

Answer: C

Watch Video Solution

100. The peak voltage in the output of a half-wave diode rectifier fed with a sinusiodal signal without filter is $10V$. The dc component of the output voltage is

A. $\frac{10}{\sqrt{2}}$ V

B. $\frac{10}{\pi}$ V

C. 10 V

D. $\frac{20}{\pi}$ V

Answer: B

Watch Video Solution

101. In the following, which one of the diodes is reverse biased ?

A. Figure 2

B. Figure 3

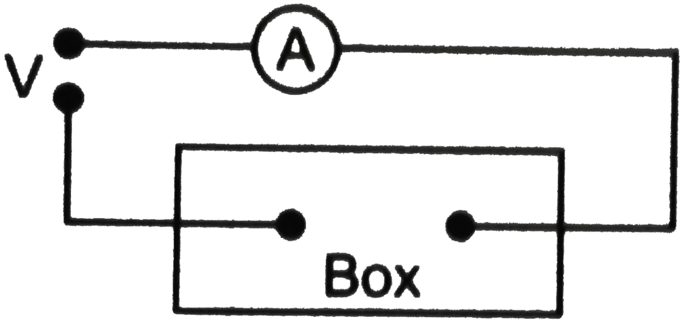
C. Figure4

D. Figure 1

Answer: A

Watch Video Solution

102. A semiconductor diode and a resistor of constant resistance are connected in some way inside a box having two external terminals. When a potential difference V of $1V$ is applied, $1 = 25mA$. If potential difference is reversed, $I = 50mA$. Forward resistance and diode resistance are



A. 40Ω and 40Ω

B. 0Ω, ∞

C. Ω, 12Ω

D. 40Ω, 20Ω

Answer: A

Watch Video Solution

103. Which circuit will not show current in ammeter ?

A. Figure 1

B. Figure 2

C. Figure 3

D. Figure 4

Answer: A

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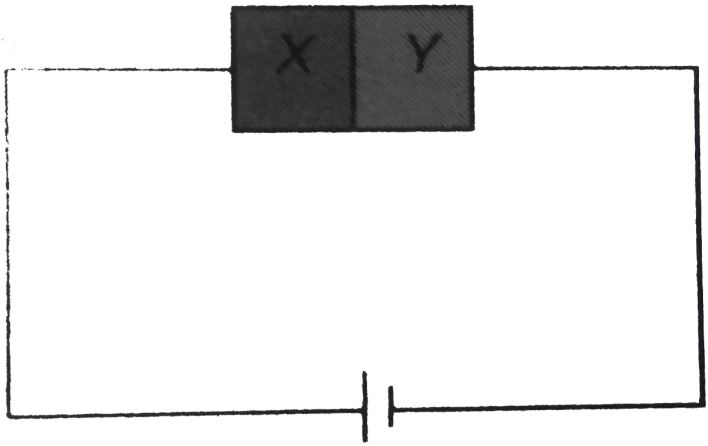
104. A semiconductor X is made by dopping a germanium crystal with arsenic $(Z = 33)$. A scond semiconductor Y is made by dopping germanium with indium $(Z = 49)$. The two are joined end to end and connected to a battery as shown. Which of the following statements is correct?



A. X is p-type, Y is n-type and the junction is forward biased

B. X is n-type, Y is p-type and the junction is forward biased

C. X is p-type, Y is n-type and the junction is reverse biased

D. X is n-type, Y is p-type and the junction is reverse biased

Answer: D

Watch Video Solution

105. What is the value of D.C. voltage in a half wave rectifier in converting AC. voltage V = 100 sin (314 t) into D.C.?

A. 100 volt

B. 50 volt

C. 32 volt

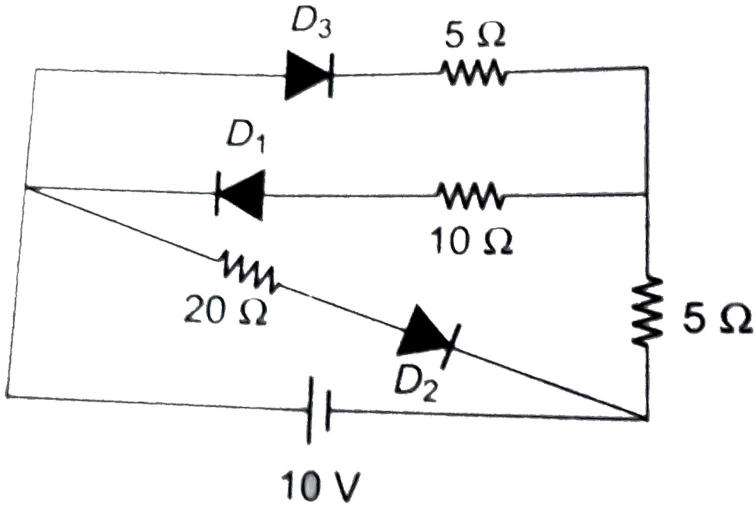
D. 0

Answer: C

Watch Video Solution

106. In the given circuit

The current through the battery is



A. 0.5 A

B. $1A$

C. $1.5A$

D. $2A$

Answer: C

Watch Video Solution

107. Which one of the following is the correct statement regarding the depletion region of an unbiased p-n junction?

A. Its width does not depend upon the densities of the impurities (dopants)

B. Its width is considerably increased when it is forward biased

C. The electric field in the depletion region is produd by the electrons in the conduction band and holes in the valence band

D. The potential barrier across the junction produces a very strong electric field

Answer: D

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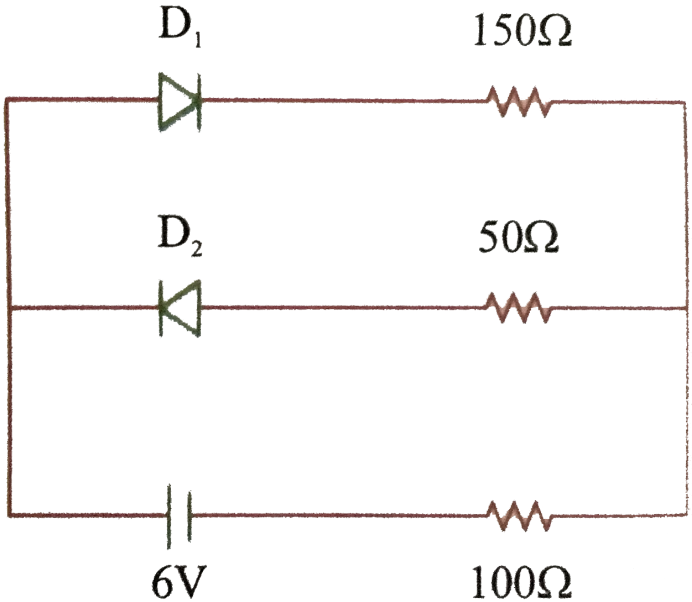
108. The circuit shown in figure (1) Contains two diodes each with a forward resistance of $50 ohm$ and with infinite reverse resistance. If the battery voltage is $6V$, the current through

the $100 ohm$ resistance is.



A. zero

B. 0.02A

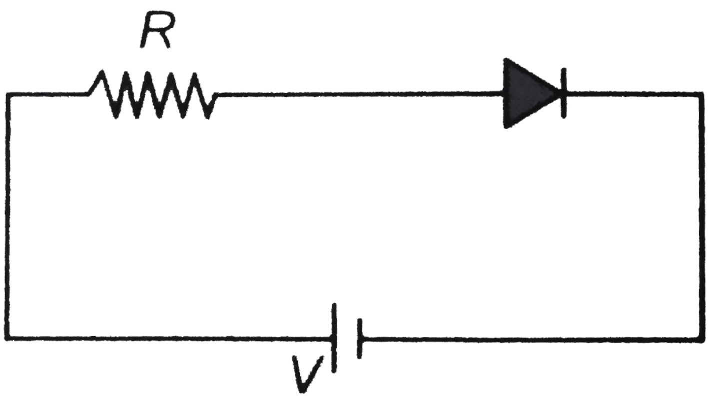
C. 0.03A

D. 0.036A

Answer: B

Watch Video Solution

109. For the given circuit of PN-junction diode, which of the following statements is correct?



A. In reverse biasing the voltage across R is

2 V

B. In forward biasing the voltage across R

is 2 V

C. In forward biasing the voltage across R

is V

D. In reverse biasing the voltage across R is

V

Answer: C

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110. Colour of light emitted by LED depends upon

A. its forward bias

B. its reverse bias

C. the material of the semiconductor

D. the amount of forward or reverse current

Answer: C

Watch Video Solution

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

A. its leakage current is small

B. it has low reverse resistance

C. It has strong co-valent bonds

D. It is lightly doped

Answer: D

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112. State the reason, why GaAs is most commonly used in making of a solar cell.

A. a zener diode

B. a light emitting diode

C. a transistor

D. a half wave rectifier

Answer: B

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113. A solar cell works on the principle of

A. photoelectricity

B. photographic camera

C. photovoltaic conversion

D. photosynthesis

Answer: C

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114. Silicon and Germanium p-n junction diodes are not used for making $LEDs$

A. Silicon dioxide

B. Gallium arsenide [Ga As]

C. Gallium phosphide (Ga P]

D. Gallium arsenide phosphide [Ga As P]

Answer: B

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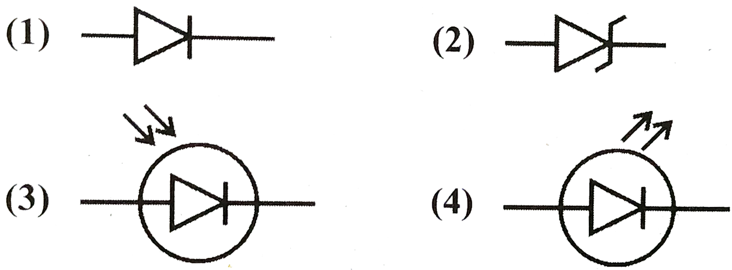
115. A light emining diode is shown as



A. 3

B. 4

C. 2

D. 1

Answer: B

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116. A $p-n$ photodiode is made of a material with a band gap of $2.0 eV$. The minimum frequency of the radiation that can be absorbed by the material is nearly

A. 10×10^{14} Hz

B. 20×10^{13} Hz

C. 5×10^{13} Hz

D. 5×10^{14} Hz

Answer: D

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117. Consider the following statements A and B and identify the correct answer.

(A)A zener diode should be connected in reverse bias for proper functioning

(B) The potential barrier of a p-n junction lies between 2 V and 5 V

A. Both A and B are correct

B. Both A and B are wrong

C. A is wrong and B is correct

D. A is correct but B is wrong

Answer: D

Watch Video Solution

118. In a circuit a diode was used and the output voltage across the diode was always 50 volts, even if the input voltage fluctuated between 110 V to 90 V. The diode used in the circuit was

A. a junction diode

B. photodiode

C. zener diode

D. light emitting diode

Answer: C

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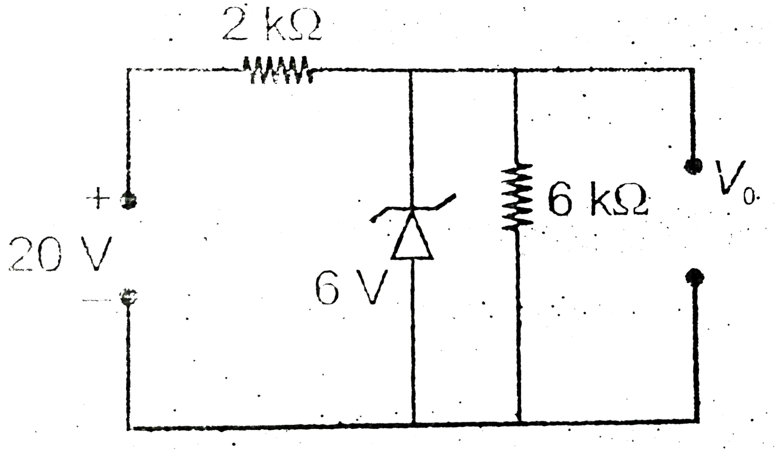
119. What is the value of output voltage V_0 in the circuit shown in the figure ?



A. 7 V

B. 8 V

C. 15 V

D. 23 V

Answer: B

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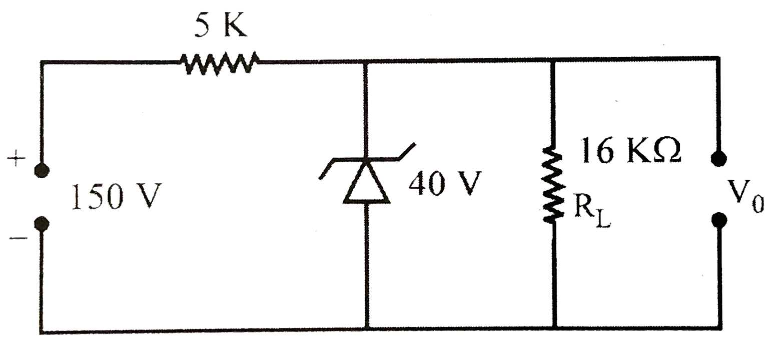
120. What is the load current in the following zener circuit?



A. 0.1 mA

B. 2.5 mA

C. 3.5 mA

D. 5 mA

Answer: B

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121. Light emitting diodes are used in 'alphanumeric' displays of advertisements. This means that the display consists of

A. only letters like A, B, C, D

B. only numbers like 1, 2, 3, 4

C. Both numbers and letters

D. only pictures

Answer: C

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122. In a p-i-n diode solar cell, the width of the depletion region is increased by using

A. a p-type semiconductor

B. an n-type semiconductor

C. an intrinsic semiconductor

D. an n-p-n transistor

Answer: C

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123. Which one of the following currents remains approximately constant, when the source voltage of a zener diode stabiliser is increased?

A. Zener constant

B. Load current

C. Total current

D. Series current

Answer: B

Watch Video Solution

124. The light emitting diode (LED),

A. always used in reverse biased condition

B. never used in forward or reverse biased condition

C. used both in the forward and reverse biased condition depending upon its application

D. always used in forward biased condition

Answer: D

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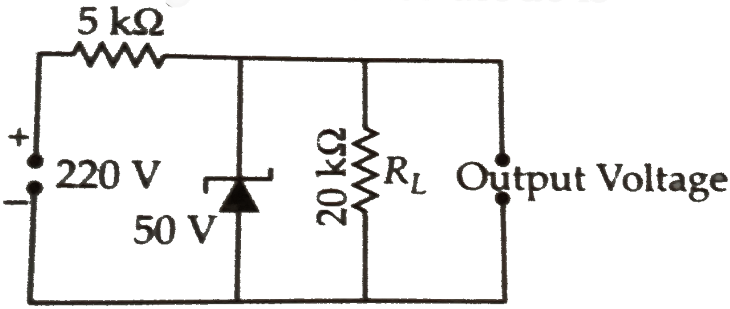
125. From the Zener diode circuit shown in figure, the current through the Zener diode is



A. 10 mA

B. 15 mA

C. 20 mA

D. 25 mA

Answer: B

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126. A zener diode has a contract potential of $0.8V$ in the absence of biasing. It undergoes zener breakdown for an electric field of $10^6 Vm^{-1}$ at the depletion region of p-n junction. If the width of the depletion region is 2.4mu m, what should be the reverse biased potential for the zener breakdown to occur?

A. 3.5 V

B. 2.5 V

C. 1.5 V

D. 0.5 V

Answer: B

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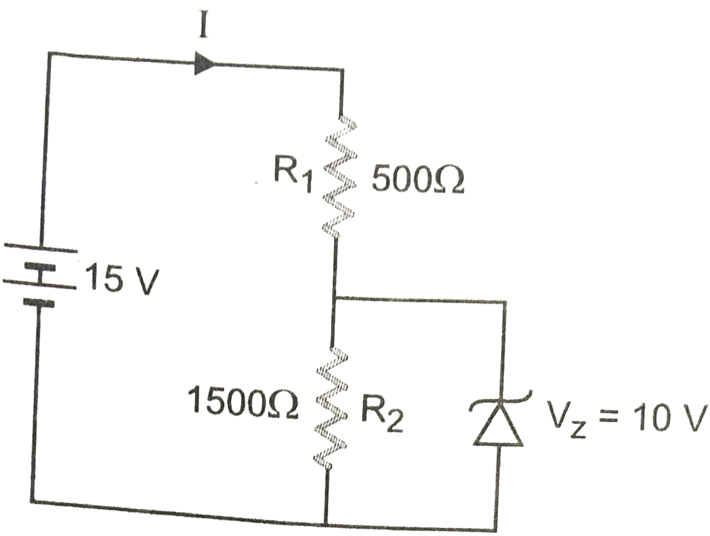
127. In the circuit, Fig The current through the zener diode is



A. 10 mA

B. 6.67 mA

C. 5 mA

D. 3.33 mA

Answer: D

Watch Video Solution

128. In the study of transistor as an amplifier , $\alpha = \frac{l_C}{l_E}$ and $\beta = \frac{I_C}{I_B}$ where I_C, I_E and I_B are the collector, emitter and base currents respectively. The correct relation between α and β is given by

A. $\beta = \dfrac{1-\alpha}{\alpha}$

B. $\beta = \dfrac{\alpha}{1-\alpha}$

C. $\beta = \dfrac{1+\alpha}{\alpha}$

D. $\beta = \dfrac{\alpha}{1+\alpha}$

Answer: B

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129. When $n-p-n$ transistor is used as an amplifier :

A. holes move from emitter to base

B. holes move from base to emitter

C. electrons move from base to collector

D. electrons move from collector to base

Answer: C

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130. For a transistor circuit in common emitter configuration, the voltage gain is 100. If the input voltage is 20 m V, then the output voltage is

A. 400 mV

B. 1 V

C. 2 V

D. 0.5 V

Answer: C

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131. If for a transistor, β = 49, then the value of α is

A. 1

B. 0.49

C. 0.98

D. 15

Answer: C

Watch Video Solution

132. If α= 60/61 for a transistor, the value of β is

A. 50

B. 60

C. 1.5

D. 2

Answer: B

Watch Video Solution

133. In an n-p-n transistor, the collector current is 10 mA. If 90% of the electrons emitted reach the collector, then the emitter current will be

A. 9 mA

B. 1 mA

C. 2 mA

D. 8 mA

Answer: B

Watch Video Solution

134. In a silicon transistor, a change of $7.89mA$ in the emitter current produce a change of 7.8 mA in the collector current. What change in the base current is necessary to produce an equivalent change in the collector current?

A. 0.9 μm

B. 900 μm

C. 90 μm

D. 9 μm

Answer: C

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135. The transfer ration of a transistor is 50. The input resistance of the transistor when used in the common -emitter configuration is $1k\Omega$. The peak value for an $A.C.$ input voltage of $0.01V$ peak is

A. 250 μm

B. 500 μm

C. 750 μm

D. 900 μm

Answer: B

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136. What is the voltage gain in a common emitter amplifier when the input resistance is 200 Ω and the load resistance is $1 K\Omega$? (β = 50)

A. 100

B. 150

C. 200

D. 250

Answer: D

Watch Video Solution

137. A transistor connected in CE mode , has a current gain of 50. If the load resistance is 5 K, input resistance is 1 K and the input peak voltage is 0.4 V, then the peak output voltage will be

A. 25 V

B. 50 V

C. 75 V

D. 100 V

Answer: D

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138. Three energy levels L_1, L_2 and L_3 of a hydrogen atom correspond to increasing values of energy i.e., $E_{L_1} < E_{L_2} < E_{L_3}$. If the wavelength corresponding to the transitions L_3 to L_2, L_2 to L_1 and L_3 to L_1 are λ_3, λ_2 and λ_1 respectively then

A. $l_1 > l_2 > l_3$

B. $l_3 < l_2 < l_1$

C. $l_3 > l_2 > l_1$

D. $l_1 = l_2 = l_3$

Answer: C

Watch Video Solution

139. In a n-p-n transister circuit the collector current is $9mA$. If 90% of the electrons emitted reach the collector, find emitter current and base current

A. the base current is 10 mA

B. the emitter current is 1 mA

C. α=0.9 and β = 9

D. α = 0.99 and β =99

Answer: C

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140. For a transistor, β = 50. To change the collector current by 350 μA, the base current should be changed by

A. $\left(\frac{50}{350}\right)\mu A$

B. $(350 - 50)\mu A$

C. $(350 + 50)\mu A$

D. $\left(\frac{350}{50}\right)\mu A$

Answer: D

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141. The current gain in the CE mode of a transistor is 10. If the input impedance is 10 K Ω and load resistance = 60 KΩ, then the power gain will be

A. 200

B. 400

C. 600

D. 700

Answer: C

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

A. as a CE amplifier

B. as an on/off switch

C. in an oscillator

D. as a CB amplifier

Answer: B

Watch Video Solution

143. For a transistor $\frac{1}{\alpha} - \frac{1}{\beta}$ is equal to

A. two

B. three

C. one

D. zero

Answer: C

Watch Video Solution

144. What is the current gain for a transistor used as a common emitter amplifier, if the current gain of the same transistor used in common base mode is 0.95 ?

A. 25

B. 49

C. 19

D. 15

Answer: C

Watch Video Solution

145. The difference in the working of a step up transformer and an amplifier is

A. the transformer decreases the power whereas the amplifier keeps the power constant

B. the transformer increases the power but the amplifier decreases the power

C. the amplifier increases the power but the transformer cannot increase the power

D. the amplifier decreases the power but the transformer keeps the power constant

Answer: C

Watch Video Solution

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

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

Answer: C

Watch Video Solution

147. To obtain the current gain (β) of a transistor, when it is in CE mode, we use

A. its input characteristics

B. its current transfer characteristics

C. its output characteristics

D. any one of the above three characteristics

Answer: B

View Text Solution

148. The r.m.s. value of the base current ofa transistor is 10μA. What is the current gain (β) if the peak value of the a.c. collector current is 1.414 mA ?

A. 50

B. 75

C. 100

D. 125

Answer: C

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149. When a transistor amplifier having current gain of 75 is given an input signal, $V_I = 2\sin(157t + \pi/2)$, the output signal is found to be $V_o = 200\sin(157t + 3\pi/2)$. The transistor is connected as :

A. a common base amplifier

B. a common collector amplifier

C. an oscillator

D. a common emitter amplifier

Answer: D

Watch Video Solution

150. The input signal given to a CE amplifier having a voltage gain of 150 is $V_i = 2\cos\left(15t + \frac{\pi}{3}\right)$. The corresponding output signal will be

A. 100 sin $\left(10t + \frac{\pi}{3}\right)$

B. $100\sin\left(10t + \frac{4\pi}{3}\right)$

C. $200\sin\left(10t + \frac{2\pi}{3}\right)$

D. $100 \sin(10t + \pi)$

Answer: B

Watch Video Solution

151. For a common emitter amplifier, the voltage gain is 40. Its input and output impedances are 100 Ω and 400 Ω respectively. The power gain of the C.E. amplifier will be

A. 300

B. 400

C. 450

D. 500

Answer: B

Watch Video Solution

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

A. Zero

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. π

Answer: A

Watch Video Solution

153. A transistor connected in CE mode , has a current gain of 50. If the load resistance is 5 K, input resistance is 1 K and the input peak voltage is 0.4 V, then the peak output voltage will be

A. 120

B. 150

C. 80

D. 200

Answer: B

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154. In a common base mode of transistor, 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. 45

B. 50

C. 55

D. 60

Answer: C

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155. Three amplifier circuit are connected in series. The voltage gain of each is 5. What is the final voltage amplification?

A. 15

B. 125

C. $\frac{5}{3}$

D. 25

Answer: B

Watch Video Solution

156. The current gain of a transistor in common base mode is 0.99. What is the change in collector current if the emitter current changes by 5 mA ?

A. 0.195 mA

B. 4.95 mA

C. 3.25 mA

D. 0.495 mA

Answer: B

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157. When a transistor amplifier having current gain of 75 is given an input signal, $V_I = 2\sin(157t + \pi/2)$, the output signal is found to be $V_o = 200\sin(157t + 3\pi/2)$. The transistor is connected as :

A. common base amplifier

B. common emitter amplifier

C. common collector amplifier

D. feed back amplifier

Answer: B

Watch Video Solution

158. For a common emitter amplifier, input resistance $(R_i) = 500\Omega$ and load resistance $R_L = 5000\Omega$. If β = 60, then the voltage gain is

A. 60

B. 600

C. 6

D. 100

Answer: B

Watch Video Solution

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

A. 36 mA

B. 26mA

C. 16 mA

D. 6mA

Answer: D

Watch Video Solution

160. In a positive feedback oscillator, the feedback voltage (signal) and the input signal (voltage) have a phase difference of

A. 45°

B. 90°

C. 180°

D. 0°

Answer: D

View Text Solution

161. A transistor -oscillator using a resonant circuit with an inductor L (of negligible resistance) and a capacitor C in series produce oscillations of frequency f. If L is doubled and C is changed to $4C$, the frequency will be

A. f / 2

B. f / 4

C. 8 f

D. $f/2\sqrt{2}$

Answer: D

Watch Video Solution

162. In a transistor in CE configuration, the ratio of power gain to voltage gain is

A. α

B. $\frac{\beta}{\alpha}$

C. $\beta\alpha$

D. β

Answer: D

Watch Video Solution

163. A common emitter amplifier gives an output of 3 V for an input of 0.01 V. If β of the resistance is 100 and the input resistance is $1k\Omega$. then the collector resistance is

A. 1 KΩ

B. 3 KΩ

C. 30 KΩ

D. 30 KΩ

Answer: B

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Watch Video Solution

164. 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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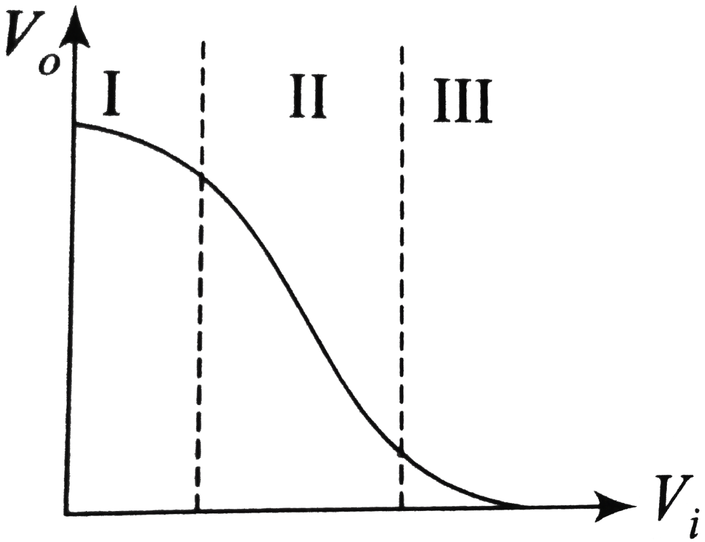
165. Transfer characterstics [output voltage (V_o) vs. input voltage (V_i)] for a base biased transistor in CE configuration is as shown in the figure. For using transfor as a which, it is used



A. In region I

B. Both in region (I) and (III)

C. In region III

D. In region II

Answer: B

Watch Video Solution

166. In NPN transistor, if doping in base region is increased then collector current

A. Decreases

B. Increases

C. Remain same

D. None of these

Answer: A

Watch Video Solution

167. In a PNP transistor, N-type semiconductor is used as the

A. collector only

B. base only

C. emitter only

D. collector or emitter

Answer: B

Watch Video Solution

168. Which one of the following is not necessary in a feedback oscillator ?

A. Amplifier

B. Feedback circuit

C. External input signal

D. Frequency

Answer: C

Watch Video Solution

169. The current gain ofa transistor is 100. If the base current changes by 200 μA, what is the change in collector current?

A. 0.2mA

B. 20 mA

C. 2 mA

D. 200mA

Answer: B

Watch Video Solution

170. In a common base mode of a transition , the collector current is $5.488mA$ for an emitter currect of $5.60mA$. The value of the base current amplification factor (β) will be

A. 51

B. 48

C. 49

D. 50

Answer: C

Watch Video Solution

171. The current gain for a transistor working as a common-base amplifier is 0.96. If the emitter current is $7.2 mA$, the base current will be

A. 0.39mA

B. 0.43 mA

C. 0.35 mA

D. 0.29mA

Answer: D

Watch Video Solution

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

A. emitter

B. base

C. collector

D. can be any of the above three

Answer: A

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173. A $n-p-n$ transistor conducts when

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

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

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

D. collector is positive and emitter is at the same potential as the base

Answer: B

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174. For a transitor the current ratio α_{DC} is 69/70 the current gain β_{DC} is

A. 66

B. 67

C. 69

D. 71

Answer: C

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175. How many electrodes are there in a transistor ?

A. 2

B. 3

C. 4

D. 5

Answer: B

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176. In a PNP transistor, N-type semiconductor is used as the

A. collector only

B. base only

C. emitter only

D. collector or emitter

Answer: B

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177. Which of the following is correct, about doping in a transistor ?

A. Emitter is heavily dopped, collector is lightly dopped and base in moderately

B. Emitter is lightly dopped, collector is heavily dopped and base in moderately

C. Emitter is heavily

D. Emitter is lightly

Answer: C

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178. For a transistor in common emitter configuration, the voltage drop across the load of 1000 Ω is 0.5 V. If the value of α for the transistor is 0. 98, then the base current will be approximately equal to

A. 5 μA

B. $8 \mu A$

C. $10 \mu A$

D. $15 \mu A$

Answer: C

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179. Consider an $n-p-n$ transistor amplifer in common-emitter configuration. The current gain of the transistor is 100. If the collector current changes by $1mA$, what will be the change in emitter current?

A. 1.00mA

B. 0.99 mA

C. 1.01 mA

D. 1.5 mA

Answer: C

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180. A transistor is used in a common emitter mode as an amplifier. Then

A. the base emitter junction is reverse biased

B. the collector base junction is forward biased

C. the input signed is connected in parallel with the voltage applied to the base emitter junction

D. the input signal is connected in series with the voltage applied to the base emitter junction

Answer: D

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181. In an n-p-n transistor 10^{10} electrons enter the emitter in 10^{-6}s. If 2% of the electrons are lost in the base, find the current transfer ratio and the current amplification factor.

A. 2×10^{-10} A and 49

B. 1.6×10^{-19} A and 90

C. 1.7×10^{-11} A and 70

D. 3.2×10^{-9} A and 99

Answer: D

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182. A transistor is used in Common-emitter mode in an amplifier circuits. When a signal of 20 mV is added to the base-emitter voltage, the base current changes by $40\mu A$ and the collector current changes by 2mA. The load resistance is $5k\Omega$ then the voltage gain is

A. 15

B. 20

C. 5

D. 10

Answer: C

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183. If α and β are the current gain in the CB and CE configurations respectively of the transistor circuit, then $\frac{\beta - \alpha}{\alpha\beta} =$

A. 2

B. 1

C. 0.5

D. 1.5

Answer: B

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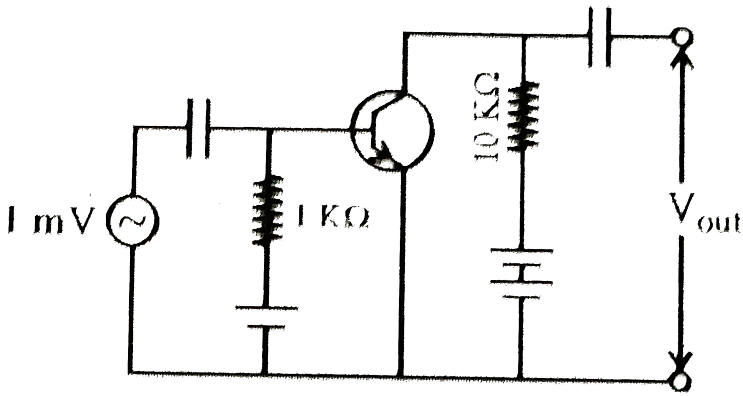
184. In the following common emitter configuration an n-p-n transistor with current gain $\beta = 100$ is used. The output voltage of the amplifier will be



A. 10 mV

B. 0.1 V

C. 1.0 V

D. 10 V

Answer: C

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

A. 10

B. 20

C. 100

D. 90

Answer: C

Watch Video Solution

186. A transistor is operated in common emitter configuration at $V_c = 2V$ such that a change in the base current from $100\mu A$ to $200\mu A$ produces a change in the collector current from $5mA$ to $10mA$. The current gain is

A. 75

B. 100

C. 150

D. 50

Answer: D

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187. 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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188. Which logic gate is represented by the following truth table?

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

A. AND

B. OR

C. NAND

D. NOR

Answer: B

189. How many $NAND$ gate are used to from AND gate?

A. 4

B. 3

C. 2

D. 1

Answer: C

Watch Video Solution

190. A NOR gate is ON only when all its inputs are

A. off

B. ON

C. high

D. positive

Answer: A

Watch Video Solution

191. Which of the following truth table represents an AND gate?

A	B	Y
0	0	1
1	0	0
0	1	0
1	1	0

(1)

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

(2)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

(3)

A	B	Y
0	0	1
1	0	1
0	1	1
1	1	0

(4)

A. 4

B. 3

C. 2

D. 1

Answer: C

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192. The truth table of a logic gate is as follows

:

A	B	Y
0	0	1
1	0	1
0	1	1
1	1	0

It corresponds to

A. OR gate

B. NOR gate

C. AND gate

D. NAND gate

Answer: D

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193. Which logic gate is represented by the following truth table ?

A	B	Y
0	0	0
1	0	0
0	1	0
1	1	1

A. OR gate

B. AND gate

C. NAND gate

D. NOT gate

Answer: B

Watch Video Solution

194. Which logic gate is represented by the following truth table?

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

A. OR gate

B. AND gate

C. NAND gate

D. NOR gate

Answer: A

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195. Give the logic symbol of NAND gate.

A. an OR gate

B. a NOT gate

C. an AND gate

D. a NAND gate

Answer: B

Watch Video Solution

196. Give the logic symbol of NOR gate.

A. an OR gate

B. A NOR gate

C. A NAND gate

D. an AND gate

Answer: B

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197. The value of $\bar{1} + \bar{1}$ is

A. 2

B. 0

C. 1

D. 10

Answer: B

Watch Video Solution

198. When the two inoputs of a NAND gate are shorted, the resulting gats is

A. an OR gate

B. an AND gate

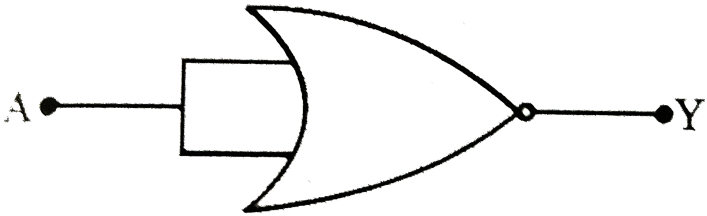
C. a NOT gate

D. NOR gate

Answer: C

Watch Video Solution

199. The logic gate circuit given below acts as



A. an OR gate

B. a NOT gate

C. an AND gate

D. a NAND gate

Answer: B

Watch Video Solution

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

A. NAND

B. NOR

C. OR

D. AND

Answer: A

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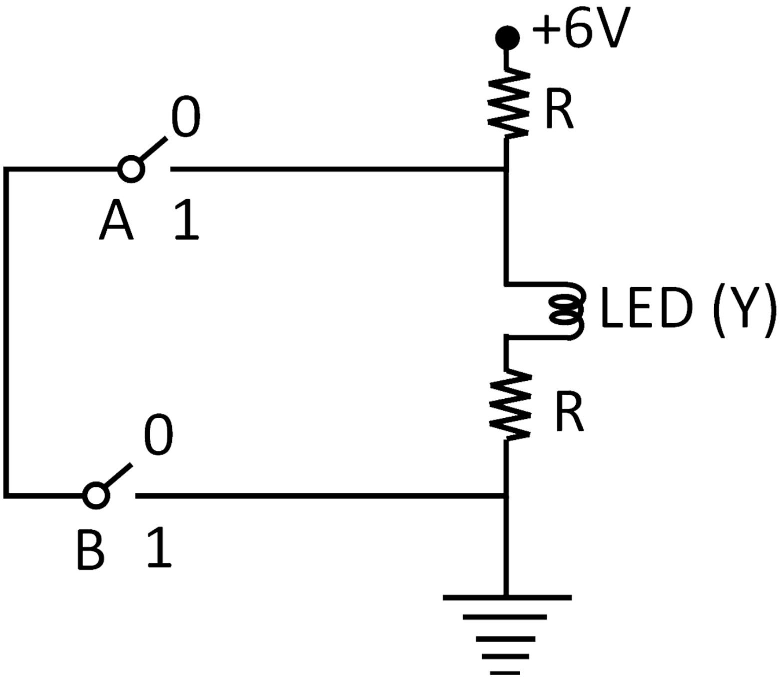
201. The correct Boolean operation represented by the circuit diagram drawn is



A. OR

B. AND

C. NAND

D. NOT

Answer: B

Watch Video Solution

202. For which logic gate the following statement is true?

All low inputs produce a high output.

A. OR

B. AND

C. NAND

D. NOT

Answer: C

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203. The truth table of a logic gate is a table

A. giving only the true numbers

B. rejecting only the wrong numbers

C. giving the relation between the input and output variables of a logic gate

D. which gives all the possible input logic levels and the corresponding resultant logic levels in the output

Answer: D

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204. For a two input logic gate, the truth table has 4 possible input combinations. For a 3 input logic gate the number of combinations (entries) in the input side of the truth table are

A. 4

B. 6

C. 8

D. 10

Answer: C

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205. The logic expression y = ABC is read as

A. y is equal to A plus B plus C

B. y is equal to A or B or C

C. y is equal to A and B and C

D. y is equal to A dot B dot C

Answer: C

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206. Identify the gates P and Q shown in the figure. Write the truth table for the combination of the gates shown.

Name the equivalent gate representing this circuit and write its logic symbol.

A. NAND and NOT

B. AND and NOT

C. OR and NOT

D. NOR and NOT

Answer: B

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207. The logic behind 'NOR' gate is that it gives

A. high output when both inputs are high

B. high output when both inputs are low

C. low output when both inputs are low

D. high output when one input is low and the other input is high

Answer: B

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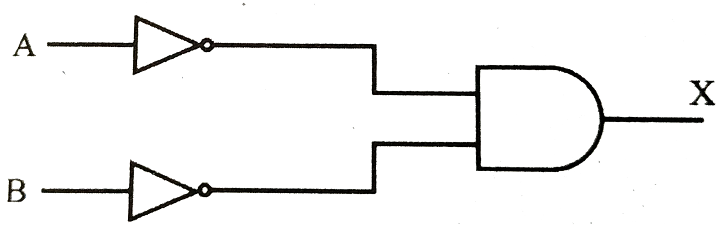
208. What is the output X of the following logic gate circuit?



A. $\overline{A.B}$

B. $\overline{A}.\overline{B}$

C. $\overline{\overline{A.B}}$

D. A+ B

Answer: B

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209. For which logic gate the following statement is true? The output is low, if and only if all inputs are low.

A. AND

B. NOR

C. NAND

D. OR

Answer: D

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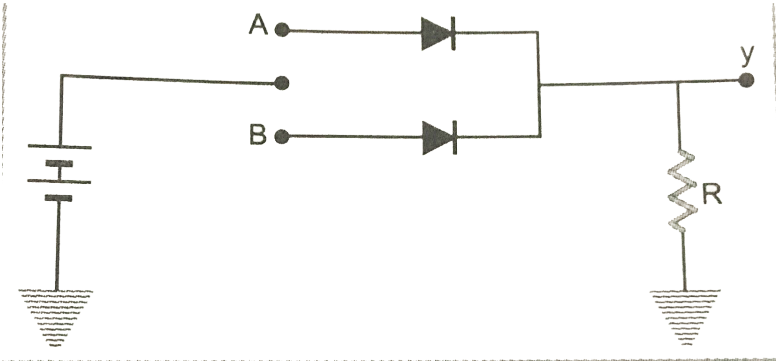
210. Name the logic gate realised using p-n junction diode in the given Fig.Give its logic symbol.



A. NAND gate

B. OR gate

C. AND gate

D. NOR gate

Answer: B

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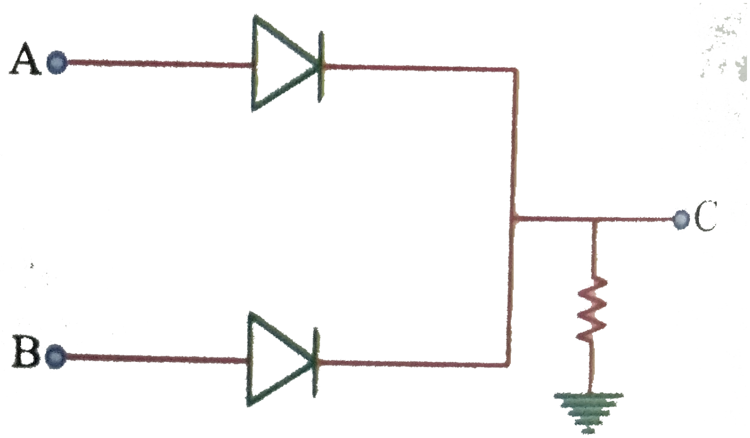
211. In the circuit below, A and B represents two inputs and C represents the output, the circuit represents.



A. AND gate

B. NAND gate

C. OR gate

D. NOR gate

Answer: C

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212. A researcher wants an alarm to sound when the temperature of air in his controlled research chamber rises above $40^{\circ} C$ or falls below $20^{\circ} C$.The alarm can be triggered by the output of

A. an AND gate

B. a NAND gate

C. a NOT gate

D. an OR gate

Answer: D

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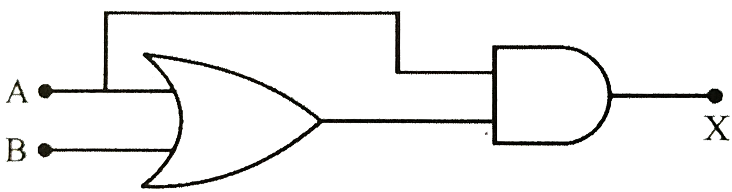
213. What is the value of the output X in the following logic gate circuit ?



A. X=A+B+A

B. X=A.(A+B)

C. X=A+(A.B)

D. X=ABC

Answer: B

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214. How many $NAND$ gate are used to from AND gate?

A. 2

B. 3

C. 4

D. 1

Answer: A

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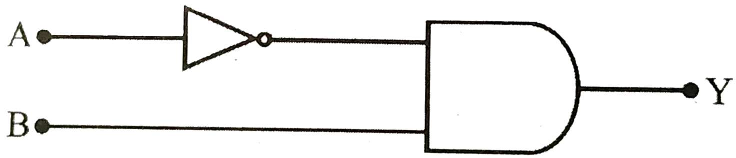
215. What is the output Y of the following logic circuit ?



A. $\overline{A}$ .B

B. B.A

C. A+B

D. $\overline{A}$ + B

Answer: A

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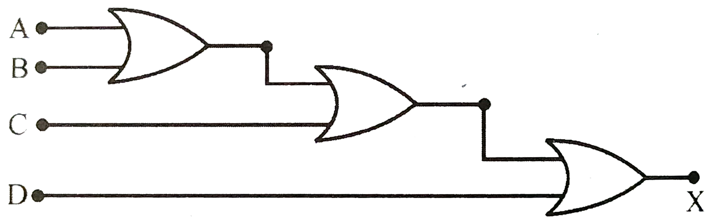
216. What is the output X of the following logic gate circuit?



A. ABCD

B. AB+C+D

C. A+B+C+D

D. AB+CD

Answer: C

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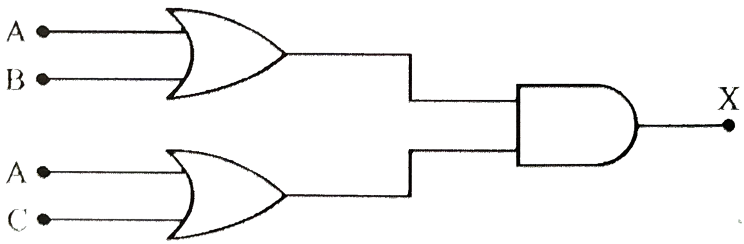
217. What is the output X of the following logic gate circuit?



A. (A+B)+(A+C)

B. (A+$\overline{B}$).($\overline{A}$+C)

C. (A.B) + (A.C)

D. (A+B) . (A+C)

Answer: D

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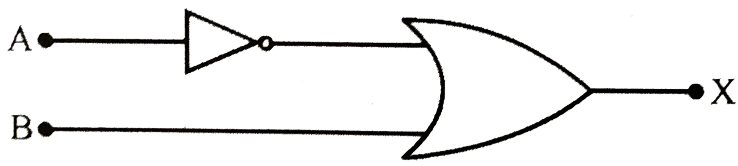
218. What is the output X in the following logic gate circuit?



A. X=A+B

B. X=A.B

C. X=A+$\overline{B}$

D. $X = \overline{A} + B$

Answer: D

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219. In a chemical process, alarm systems are to be activated whenever either the pressure or the temperature in the reaction chamber exceeds certain limits. This is done by using a logic gate whose inputs will be the voltages corresponding to the high temperature or high pressure in the reaction chamber. Which logic gate shouJd be used to activate the alarms?

A. AND gate

B. NAND gate

C. NOR gate

D. OR gate

Answer: D

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220. When the inputs of a two input logic gate are 0 and 0, the output is 1. When the inputs are 1 and 0, the output is zero. The type of logic gate is

A. an AND gate

B. a NAND gate

C. a NOT gate

D. a NOR gate

Answer: B

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221. The output of OR gate is 1

A. if either input is zero

B. only if both inputs are 1

C. if either or both inputs are 1

D. only if both inputs are zero

Answer: C

Watch Video Solution

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

A. AND

B. OR

C. NAND

D. NOR

Answer: D

Watch Video Solution

223. If the Output of two NAND gates is given to input of a NAND gate. Then the truth table will be of

A. NOR gate

B. OR gate

C. AND gate

D. XOR gate

Answer: B

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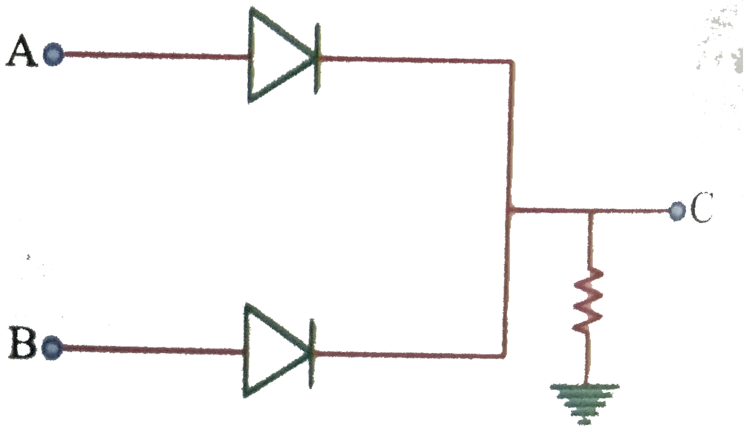
224. In the circuit below, A and B represents two inputs and C represents the output, the circuit represents.



A. AND gate

B. NAND gate

C. NOR gate

D. OR gate

Answer: D

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225. For a NAND gate the inputs and outputs for different time invervals are given below :

Time interval	Input A	Input B	Output Y
t_1 to t_2	0	1	P
t_2 to t_3	0	0	Q
t_3 to t_4	1	0	R
t_4 to t_5	1	1	S

The values taken by P,Q,R,S are respectively

A. 1,0,1,1

B. 1,1,1,0

C. 0,1,0,1

D. 0,1,0,0

Answer: B

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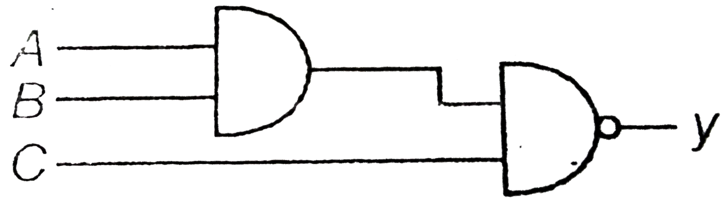

226.

The output y, when all three inputs are first high and then low, will respectively be

A. 1,0

B. 1,1

C. 0,0

D. 0,1

Answer: D

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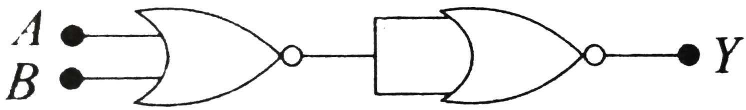
227. In the following circuit, the output Y for all possible inputs A and B is expressed by the truth table:



A.

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

B.

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

C.

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

D.

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

Answer: C

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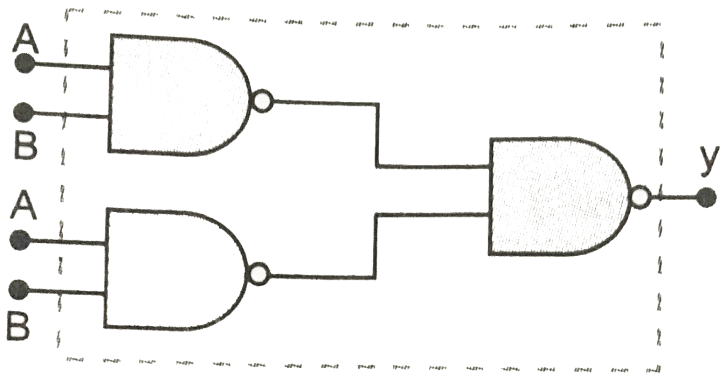
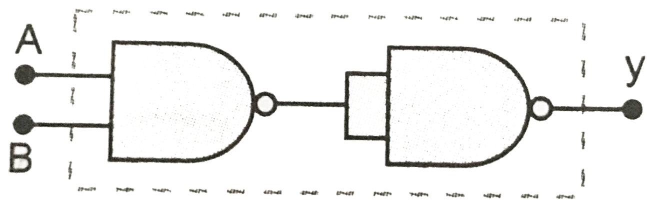
228. The combination of the 'NAND' gates shown here (Fig.) and (ii)) are equivalent to



i



ii

A. OR gate and NOT gate

B. AND gate and OR gate

C. AND gate and NOT gate

D. OR gate and AND gate

Answer: D

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229. The temperature (T) dependence of resistivity (rho) of a semiconductor is represented by :

A. Figure (2)

B. Figure (3)

C. Figure (4)

D. Figure (1)

Answer: B

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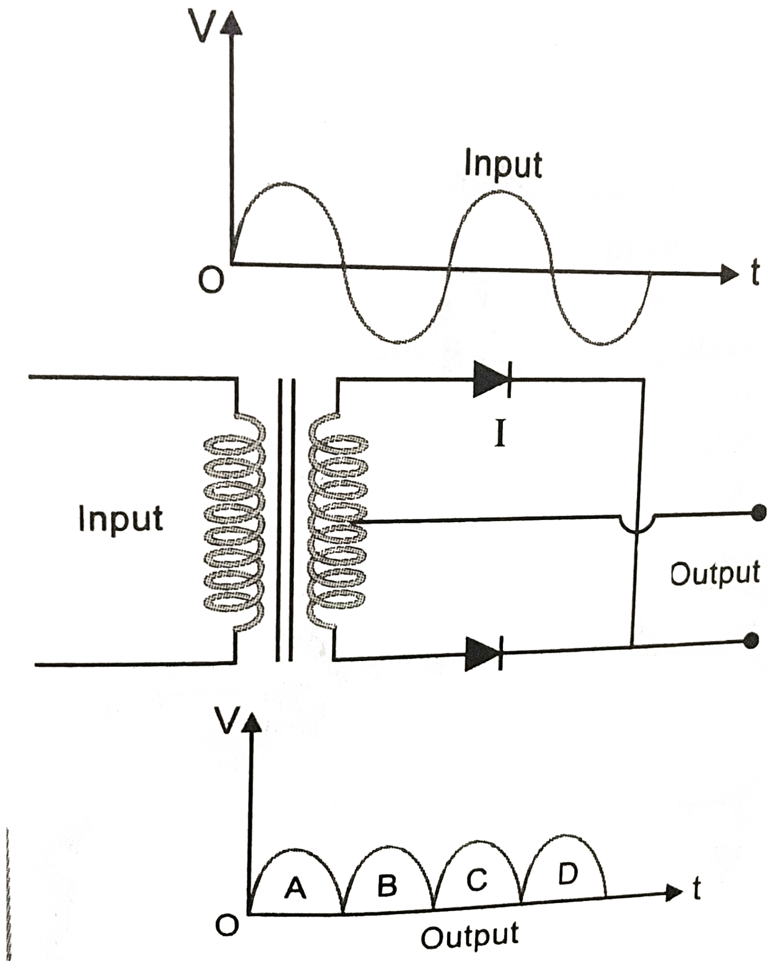
230. A full wave rectifier circuit along with the input and output are shown in Fig. the concentrations from the diode I is (are)



A. C

B. B,D

C. A,B,C,D

D. A,B

Answer: B

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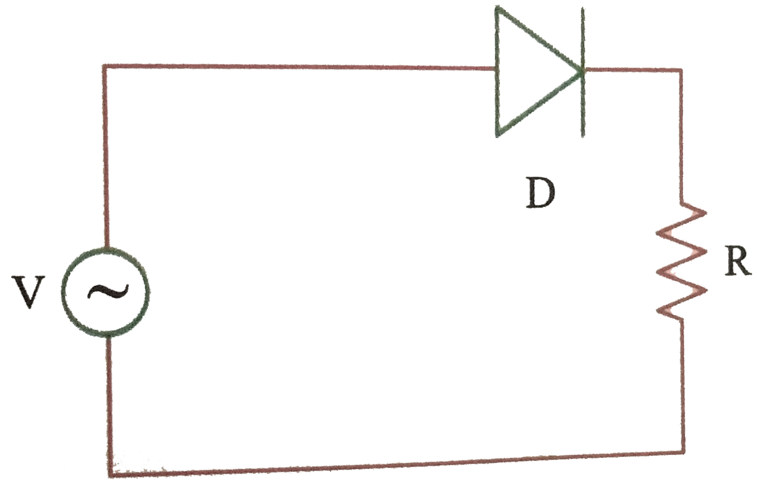
231. A $p-n$ junction (D) shown in the figure can act as a rectifier. An alternating current source (V) is connected in the circuit.



A. Figure (4)

B. Figure (3)

C. Figure (2)

D. Figure (1)

Answer: B

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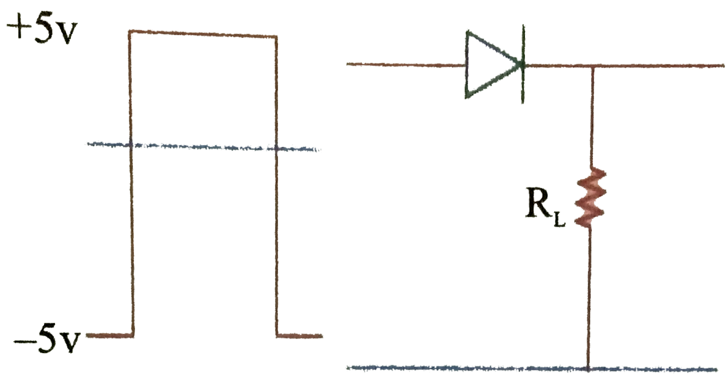
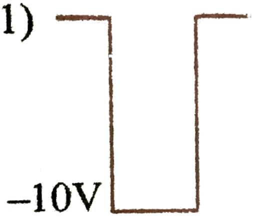
232. If a $p-n$ junction diode, a square input signal of $10V$ is applied as shown.



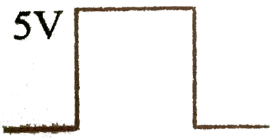
Then the out put signal across R_L will be

1)

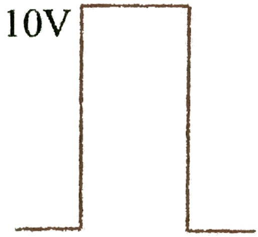


2)

3)



4)



A. Figure (4)

B. Figure (3)

C. Figure (2)

D. Figure (1)

Answer: C

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233. A hole in a P - type semiconductor is

A. an extra electron in the valence band

B. an extra electron in the conduction band

C. a missing electron in the valence band

D. a missing electron in the conduction band

Answer: C

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234. Colour of light emitted by LED depends upon

A. its forward bias

B. its reverse bias

C. the band gap of the material of the semiconductor

D. its size

Answer: C

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235. In a semiconductor , acceptor imparity is

A. Antimony

B. Indium

C. Phosphorus

D. Arsenic

Answer: B

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

A. Zero

B. less than 1

C. One

D. Infinity

Answer: C

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237. The depletion region of p-n junction has a thickness of the order of

A. 0.5 nm to 1 nm

B. 5 nm to 10 nm

C. 50 nm to 500 nm

D. 500 nm to 1000 nm

Answer: D

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238. Which logic gate corresponds to the truth table given below ?

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

A. AND

B. NOR

C. OR

D. NAND

Answer: B

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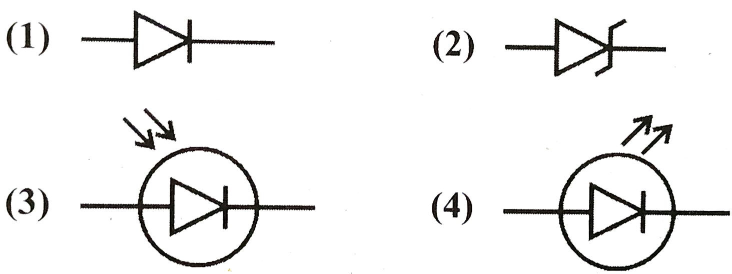
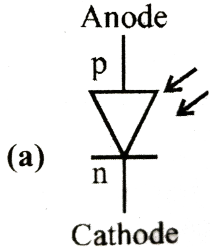
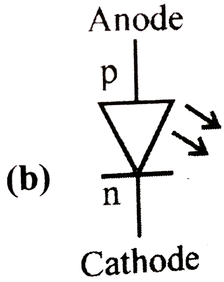
239. A light emitting diode is shown as



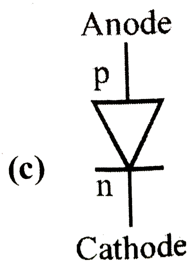
A.


Anode
p
(a)
n
Cathode

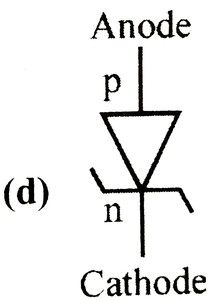
B.


Anode
p
(b)
n
Cathode

C.


Anode
p
(c)
n
Cathode

D.


Anode
p
(d)
n
Cathode

Answer: B

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

A. 1

B. 1.5

C. 2

D. 2.5

Answer: A

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241. 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 incident radiation

D. which may be operated in forward or reverse bias

Answer: A

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242. The energy band gap is maximum in

A. metals

B. super conductors

C. insulators

D. semiconductors

Answer: C

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243. INTRINSIC SEMICONDUCTORS

A. conduction band of an intrinsic semiconductor

B. conduction band of an extrinsic semiconductor

C. valance bands of intrinsic and extrinsic semiconductors

D. Super conductors

Answer: C

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244. A semiconductor is known to have an electron concentration of $5 \times 10^{13} / cm^3$ and hole concentration of $8 \times 10^{12} / cm^3$. The semiconductor is

A. an n-type semiconductor

B. a p-type semiconductor

C. an intrinsic semiconductor

D. a p-n junction

Answer: B

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245. When arsenic is added as an impurity to silicon, the resulting material is

A. an n-type semiconductor

B. a p-type semiconductor

C. insulator

D. good conductor

Answer: A

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246. which one of the following statements is wrong ?

A. The resistance of intrinsic semiconductors decreases with increase of temperature

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

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

D. A p-n junction can act as rectifier

Answer: C

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247. In a p-n junction, the thickness of the depletion layer is 10^{-6} m. If the potential difference across it is 0.2 V, then the electric field set up across the junction is

A. 10^6 V/m

B. 2×10^5 V/m

C. 10^{-6} V/m

D. 10^5 V/m

Answer: B

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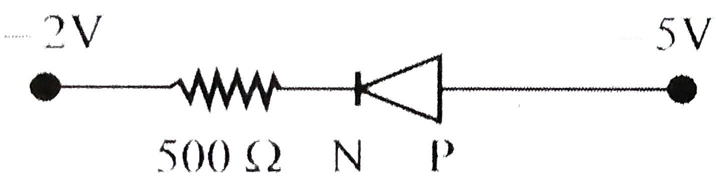
248. What is the current in the following junction diode circuit?



A. 10^{-1} A

B. 10^{-2} A

C. 5×10^{-3} A

D. Zero

Answer: D

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249. A p-n junction diode has a forward bias resistance of 10Ω and a reverse bias resistance of $10 \text{ k}\Omega$. It is connected in series with a resistance of $990 \ \Omega$ and a.d.c. source of 5V in such a way that the negative terminal of the source is connected to then region of the p-n junction. What is the current flowing in the circuit?

A. 10 mA

B. 5 mA

C. 2.5 mA

D. 12.5 mA

Answer: B

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250. The width of the depletion region in a p-n junction diode is 400 nm and an intense electric field of 8×10^5 V/m exists in it. What is the kinetic energy which a conduction electron must have in order to diffuse from then region to p region?

A. 0.16eV

B. 0.24eV

C. 0. 8 eV

D. 0.32 eV

Answer: B

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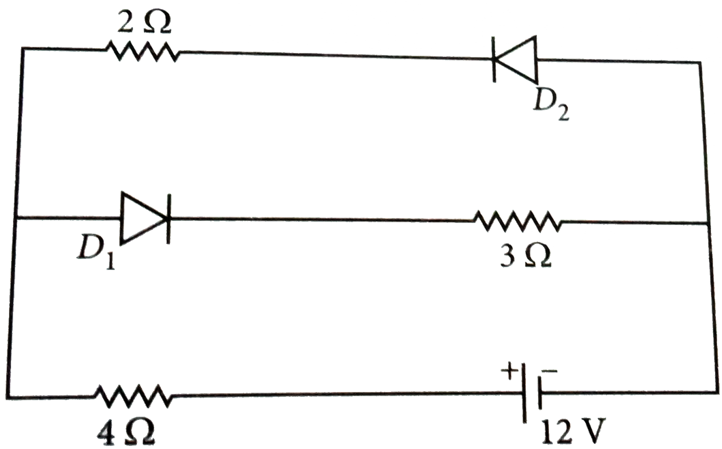
251. The circuit has two oppositely connected ideal diodes in parallel. What is the current flowing in the circuit?



A. $2A$

B. $1.5A$

C. $3.3A$

D. $1.1A$

Answer: A

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252. State the reason, why GaAs is most commonly used in making of a solar cell.

A. Gallium arsenide

B. Indium arsenide

C. Cadmium arsenide

D. Silicon

Answer: D

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253. Avalanche breakdown is due to

A. heavy doping

B. thermal ionisation

C. impact ionisation

D. combination of holes and electrons

Answer: C

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254. A P-N photodiode is fabricated from a semiconductor with a band gap of 2.5 eV. It can detect a signal of wavelength :-

A. 6000 Å

B. 6000 nmn

C. 4000 nm

D. 4000 Å

Answer: D

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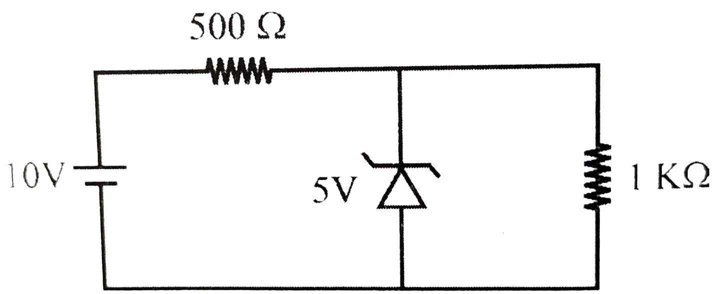
255. What is the current flowing through 1 KΩ restsor in the following circuit ?



A. 2 mA

B. 3 mA

C. 4mA

D. 5 mA

Answer: D

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256. For a transistor, β = 50. Input resistance (R_i) = 200Ω. Output resistance (R_o) = 2000Ω. The voltage gain of the amplifier is

A. 300

B. 500

C. 100

D. 600

Answer: B

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257. A transistor is used in common emitter configuration. Given its $\alpha = 0.9$, calculate the change in collector current when the base current changes by $2\mu A$.

A. $3\mu A$

B. $9\mu A$

C. $18\mu A$

D. $30\mu A$

Answer: B

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258. If the current gain in CB configuration is 0.96, then the current gain in the CE configuration will be

A. 24

B. 20

C. 16

D. 12

Answer: A

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259. For a transistor the parameter $\beta = 99.$

The value of the parameter α is

A. 1

B. 0.9

C. 0.99

D. 9.9

Answer: C

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260. The following truth table corresponds to the logic gate

$$\left|\begin{array}{ccccc} A & 0 & 0 & 1 & 1 \\ B & 0 & 1 & 0 & 1 \\ X & 0 & 1 & 1 & 1 \end{array}\right|$$

A. a NOR gate

B. an OR gate

C. a NAND gate

D. an AND gate

Answer: D

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261. The following truth table belongs to which one of the following four gates?

A	B	C
1	1	0
1	0	0
0	1	0
0	0	1

A. AND

B. NAND

C. OR

D. NOR

Answer: D

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