

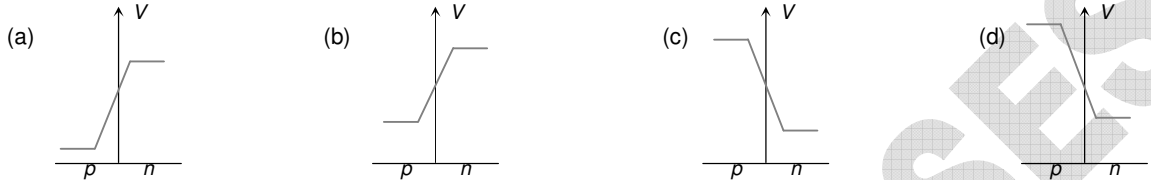
Solid and Semiconductor Assignment

- The band gap in Germanium and silicon in eV respectively is
(a) 0.7, 1.1 (b) 1.1, 0.7 (c) 1.1, 0 (d) 0, 1.1
- Wires *P* and *Q* have the same resistance at ordinary (room) temperature. When heated, resistance of *P* increases and that of *Q* decreases. We conclude that
(a) *P* and *Q* are conductors of different materials (b) *P* is *n*-type semi-conductor and *Q* is *p*-type semi-conductor
(c) *P* is semi-conductor and *Q* is conductor (d) *P* is conductor and *Q* is semiconductor
- The nature of binding for a crystal with alternate and evenly spaced positive and negative ions is
(a) Covalent (b) Metallic (c) Dipolar (d) Ionic
- If the distance between the conduction band and valence band is 1 eV, then this combination is
(a) Metal (b) Insulator (c) Conductor (d) Semiconductor s
- For a crystal system, $a = b = c$, $\alpha = \beta = \gamma \neq 90^\circ$, the system is
(a) Tetragonal system (b) Cubic system (c) Orthorhombic system (d) Rhombohedral system
- Which of the following statements is wrong
(a) A single representative unit spread out in whole of the material in ordered regular arrays gives a single crystal
(b) A polycrystal is compared of grains in which regular periodicity is broken inside the grains but regularity is maintained at grain boundaries
(c) In an amorphous material each grain is composed of a single representative unit
(d) In liquid crystals periodicity is maintained in only one or two dimensions.
- At ordinary temperatures, the electrical conductivity of semi conductors in *mho/metre* is in the range
(a) 10^{-3} to 10^{-4} (b) 10^6 to 10^9 (c) 10^{-6} to 10^{-10} (d) 10^{-10} to 10^{-16}
- 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
- 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
- Donor type impurity is found in
(a) Trivalent elements (b) Pentavalent elements (c) In both the above (d) None of these
- The difference in the variation of resistance with temperature in a metal and a semiconductor arises essentially due to the difference in the
(a) Variation of scattering mechanism with temperature (b) Crystal structure
(c) Variation of the number of charge carriers with temperature (d) Type of bonding
- A piece of semiconductor is connected in series in an electric circuit. On increasing the temperature, the current in the circuit will
(a) Decrease (b) Remain unchanged (c) Increase (d) Stop flowing
- When a semiconductor is heated, its resistance
(a) Decreases (b) Increases (c) Remains unchanged (d) Nothing is definite
- In a semiconductor, the concentration of electrons is $8 \times 10^{14} / \text{cm}^3$ and that of the holes is $5 \times 10^{12} / \text{cm}^3$. The semiconductor is
(a) *P*-type (b) *N*-type (c) Intrinsic (d) *PNP*-type
- In intrinsic semiconductor at room temperature, number of electrons and holes are
(a) Equal (b) Zero (c) Unequal (d) Infinite
- To obtain *P*-type *Si* semiconductor, we need to dope pure *Si* with
(a) Aluminium (b) Phosphorous (c) Oxygen (d) Germanium
- When the electrical conductivity of a semiconductor is due to the breaking of its covalent bonds, then the semiconductor is said to be
(a) Donar (b) Acceptor (c) Intrinsic (d) Extrinsic
- Which impurity is doped in *Si* to form *N*-type semi-conductor

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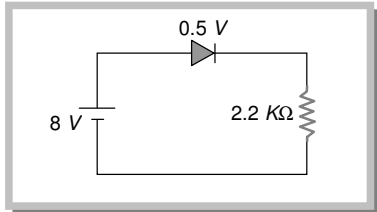
- (a) AI (b) B (c) As (d) None of these

19. 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 $0K$
 (d) None of these
20. The $P-N$ junction diode is used as
 (a) An amplifier (b) An oscillator (c) A rectifier (d) A modulator
21. In a forward biased $P-N$ junction diode, the potential barrier in the depletion region is of the form ...



22. 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 increased
23. A crystal diode is a
 (a) Non-linear device (b) Amplifying device (c) Linear device (d) Fluctuating device
24. In a $P-N$ junction photo cell, 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
25. The peak voltage in the output of a half-wave diode rectifier fed with a sinusoidal signal without filter is $10V$. The dc component of the output voltage is
 (a) $20/\pi V$ (b) $10/\sqrt{2} V$ (c) $10/\pi V$ (d) $10 V$
26. In the circuit, if the forward voltage drop for the diode is $0.5V$. The current will be

- (a) $3.4 mA$
 (b) $2 mA$
 (c) $2.5 mA$
 (d) $3 mA$

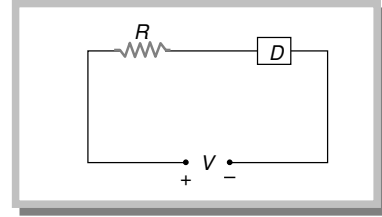


27. In the middle of the depletion layer of a reverse-biased $P-N$ junction, the
 (a) Potential is zero (b) Electric field is zero
 (c) Potential is maximum (d) Electric field is maximum
28. If a full wave rectifier circuit is operating from $50 Hz$ mains, the fundamental frequency in the ripple will be
 (a) $50 Hz$ (b) $70.7 Hz$ (c) $100 Hz$ (d) $25 Hz$
29. Barrier potential of a $P-N$ junction diode does not depend on
 (a) Temperature (b) Forward bias (c) Doping density (d) Diode design
30. In the depletion region of an unbiased $P-N$ junction diode there are
 (a) Only electrons (b) Only holes (c) Both electrons and holes (d) Only fixed ions
31. The reverse biasing in a $P-N$ junction diode
 (a) Decreases the potential barrier (b) Increases the potential barrier
 (c) Increases the number of minority charge carriers (d) Increases the number of majority charge carriers
32. The electrical circuit used to get smooth dc output from a rectifier circuit is called
 (a) Oscillator (b) Filter (c) Amplifier (d) Logic gates
33. The approximate ratio of resistances in the forward and reverse bias of the PN junction diode is
 (a) $10^2 : 1$ (b) $10^{-2} : 1$ (c) $1 : 10^{-4}$ (d) $1 : 10^4$

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34. An ideal diode is connected in series with a resistor R then voltage across R will be

- (a) $2V$ in forward bias
- (b) V in forward bias
- (b) V in reverse bias
- (c) Zero in forward bias
- (d)



35. In a $P-N$ junction diode

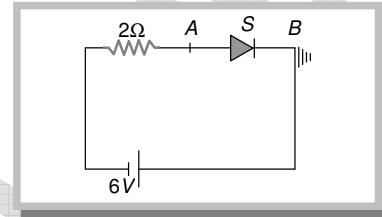
- (a) Potential at P is more than N
- (b) Potential at P is less than N
- (c) Potential at P and N is the same
- (d) Fluctuating potential between P and N

36. On increasing the reverse bias to a large value in a $P-N$ junction diode, the current

- (a) Remains fixed
- (b) Decrease slowly
- (c) Increase slowly
- (d) Suddenly increases

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

- (a) $6V$
- (b) $0.6V$
- (c) $0.7V$
- (d) $0V$



38. Function of rectifier is

- (a) To convert ac into dc
- (b) To convert dc into ac
- (c) Both (a) and (b)
- (d) None of these

39. 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 of the battery, then the $P-N$ junction behaves like

- (a) A conductor
- (b) An insulator
- (c) A super-conductor
- (d) A semi-conductor

40. The depletion layer in the $P-N$ junction region is caused by

- (a) Drift of holes
- (b) Diffusion of charge carriers
- (c) Migration of impurity ions
- (d) Drift of electrons

41. On increasing the reverse bias to a large value in a $P-N$ junction diode, current

- (a) Increase slowly
- (b) Remains fixed
- (c) Suddenly increases
- (d) Decreases slowly

42. To make a $P-N$ junction conducting

- (a) The value of forward bias should be more than the barrier potential
- (b) The value of forward bias should be less than the barrier potential
- (c) The value of reverse bias should be more than the barrier potential
- (d) The value of reverse bias should be less than the barrier potential

43. According to diagram an ac source of 50 Hz is connected to a transformer coil by a filter. P and Q ends of the secondary coil are connected to a C.R.O. Choose the correct statement from the following which describes. What we get between terminals P and Q

- (a) There is no potential difference
- (b) There is alternating voltage
- (c) There is fluctuated dc between terminals P and Q and minimum value of it is zero
- (d) There is a constant dc between P and Q

44. Which is the wrong statement in following sentences ? A device in which P and N -type semiconductors are used is more useful than a vacuum type because

- (a) Power is not necessary to heat the filament
- (b) It is more stable
- (c) Very less heat is produced in it
- (d) Its efficiency is high due to a high voltage across the junction

45. In case of a $P-N$ junction diode at high value of reverse bias, the current rises sharply. The value of reverse bias is known as

- (a) Cut off voltage
- (b) Zener voltage
- (c) Inverse voltage
- (d) Critical voltage

46. A $P-N$ junction has a thickness of the order of

- (a) 1 cm
- (b) 1 mm
- (c) 10^{-6} cm
- (d) 10^{-12} cm

47. When NPN transistor is used as an amplifier

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- (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
48. The phase difference between input and output voltages of a CE circuit is
(a) 0° (b) 90° (c) 180° (d) 270°
49. An oscillator is nothing but an amplifier with
(a) Positive feed back (b) Large gain (c) No feedback (d) Negative feedback
50. The emitter-base junction of a transistor is biased while the collector-base junction is biased
(a) Reverse, forward (b) Reverse, reverse (c) Forward, forward (d) Forward, reverse

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