

Objective Questions

(For Complete Chapter)

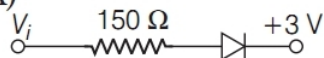
Multiple Choice Questions (MCQs)

1. In insulators (CB is Conduction Band and VB is Valence Band)
 - (a) VB is partially filled with electrons
 - (b) CB is partially filled with electrons
 - (c) CB is empty and VB is filled with electrons
 - (d) CB is filled with electrons and VB is empty
2. Identify the incorrect statement.
 - (a) In conductors, the valence and conduction bands overlap.
 - (b) Substances with energy gap of the order of 10 eV are insulators.
 - (c) The resistivity of semiconductors is lower than metals.
 - (d) The conductivity of metals is high.
3. In the band gap between valence band and conduction band in a material is 5.0 eV, then the material is
 - (a) semiconductor
 - (b) good conductor
 - (c) superconductor
 - (d) insulator
4. In *n*-type semiconductor, electrons are majority charge carriers but it does not show any negative charge. The reason is
 - (a) electrons are stationary
 - (b) electrons neutralise with holes
 - (c) mobility of electrons is extremely small
 - (d) atom is electrically neutral

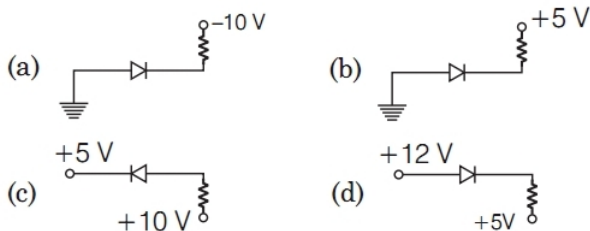
5. In a n -type semiconductor, which of the following statement is true?
- Electrons are majority carriers and trivalent atoms are dopants.
 - Electrons are minority carriers and pentavalent atoms are dopants.
 - Holes are minority carriers and pentavalent atoms are dopants.
 - Holes are majority carriers and trivalent atom are dopants.

6. If a small amount of antimony is added to germanium crystal
- the antimony becomes an acceptor atom
 - there will be more free electrons than holes in the semiconductor
 - its resistance is increased
 - it becomes a p -type semiconductor

7. In the circuit shown below, assume the diode to be ideal. When V_i increases from 2 V to 6 V, the change in the current is (in mA)



- zero
 - 20
 - $80/3$
 - 40
8. In the following figures, which one of the diode is reverse biased ?



9. When two semiconductors of p -type and n -type are brought into contact, they form a p - n junction which acts like a
- conductor
 - oscillator
 - amplifier
 - rectifier

- If both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
- If both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
- If Assertion is correct but Reason is incorrect.
- If both Assertion and Reason are incorrect.

10. **Assertion** If the temperature of a semiconductor is increased, then its resistance decreases.

Reason The energy gap between conduction band and valence band is very small.

11. **Assertion** The number of electrons in a p -type silicon semiconductor is less than the number of electrons in a pure silicon semiconductor at room temperature.

Reason It is due to law of mass action.

12. **Assertion** The resistivity of a semiconductor increases with temperature.

Reason The atoms of a semiconductor vibrate with larger amplitudes of higher temperatures thereby increasing its resistivity.

13. **Assertion** The applied voltage (in forward bias of a p - n junction) mostly drops across the depletion region and the voltage drop across the p -side and n -side of the junction is negligible.

Reason Resistance of depletion region is large compared to resistance of n -side or p -side.

Assertion-Reason Questions

Directions (Q. Nos. 10-13) In the following questions, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below