

DPP 01

- Q.1** The temperature coefficient of resistance of a semiconductor
 (A) is always positive (B) is always negative
 (C) is zero (D) may be positive or negative or zero
- Q.2** The expected energy of the electrons at absolute zero is called
 (A) Fermi energy (B) Emission energy (C) Work function (D) Potential energy
- Q.3** A semiconductor is cooled from T_1 K to T_2 K. Its resistance
 (A) will decrease (B) will increase
 (C) will first decrease and then increase (D) will not change
- Q.4** In semiconductors at room temperature,
 (A) the valence band is partially empty and the conduction band is partially filled
 (B) the valence band is completely filled and the conduction band is partially filled
 (C) the valence band is completely filled
 (D) the conduction band is completely empty
- Q.5** In a semiconducting material, the mobilities of electrons and holes are μ_e and μ_h , respectively. Which of the following is true?
 (A) $\mu_e > \mu_h$ (B) $\mu_e < \mu_h$ (C) $\mu_e = \mu_h$ (D) $\mu_e < 0; \mu_h > 0$
- Q.6** The energy gap of silicon is 1.14 eV. The maximum wavelength at which silicon will begin absorbing energy is
 (A) 10888 Å (B) 1088.8 Å (C) 108.88 Å (D) 10.888 Å
- Q.7** A semiconductor is known to have an electron concentration of $8 \times 10^{13}/\text{cm}^3$ and hole concentration of $5 \times 10^{12}/\text{cm}^3$. The semiconductor is
 (A) N-type (B) P-type (C) intrinsic (D) insulator
- Q.8** P-type semiconductor is formed when
 A. As impurity is mixed in Si
 B. Al impurity is mixed in Si
 C. B impurity is mixed in Ge
 D. P impurity is mixed in Ge
 (A) A and C (B) A and D (C) B and C (D) B and D

- Q.9** The valence of an impurity added to germanium crystal in order to convert it into a P-type semiconductor is
 (A) 6 (B) 5 (C) 4 (D) 3
- Q.10** A silicon specimen is made into a P-type semiconductor by doping, on an average, one indium atom per 5×10^7 silicon atoms. If the number density of atoms in the silicon specimen is 5×10^{28} atoms /m³, then the number of acceptor atoms in silicon per cubic centimetre will be
 (A) 2.5×10^{30} atoms /cm³ (B) 1.0×10^{13} atoms /cm³
 (C) 1.0×10^{15} atoms /cm³ (D) 2.5×10^{36} atoms /cm³.
- Q.11** A pure semiconductor has equal electron and hole concentration of 10^{16} m^{-3} . Doping by Indium increases n_h to $4.5 \times 10^{22} \text{ m}^{-3}$. What is n_e in the doped semiconductor?
 (A) 10^6 m^{-3} (B) 10^{22} m^{-3} (C) $\frac{10^{32}}{4.5 \times 10^{22}} \text{ m}^{-3}$ (D) $4 \times 10^{22} \text{ m}^{-3}$.
- Q.12** A P-type semiconductor has acceptor levels 57meV above the valence band. The maximum wavelength of light required to create a hole is (Planck's constant $h = 6.6 \times 10^{-34} \text{ J} - \text{s}$)
 (A) 57Å (B) $57 \times 10^{-3} \text{ Å}$ (C) 217100Å (D) $11.61 \times 10^{-33} \text{ Å}$

ANSWER KEY

- | | | | | | | | | | | | | | |
|----|-----|----|-----|-----|-----|-----|-----|-----|-----|----|-----|----|-----|
| 1. | (B) | 2. | (A) | 3. | (B) | 4. | (A) | 5. | (A) | 6. | (A) | 7. | (A) |
| 8. | (C) | 9. | (D) | 10. | (C) | 11. | (C) | 12. | (C) | | | | |

