

INTERNATIONAL INDIAN SCHOOL BURAIDAH

CLASS:XII SUBJECT: PHYSICS

LESSON : SEMICONDUCTOR ELECTRONICS

1. At a certain temperature in an intrinsic semiconductor, the electrons and holes concentration is  $1.5 \times 10^{16} \text{ m}^{-3}$ . When it is doped with a trivalent dopant, hole concentration increases to  $4.5 \times 10^{22} \text{ m}^{-3}$ . In the doped semiconductor, the concentration of electrons ( $n_e$ ) will be (CBSE 2023)

- (a)  $3 \times 10^6 \text{ m}^{-3}$
- (b)  $5 \times 10^7 \text{ m}^{-3}$
- (c)  $5 \times 10^9 \text{ m}^{-3}$
- (d)  $6.75 \times 10^{38} \text{ m}^{-3}$

2. During the formation of a p-n junction (CBSE 2023)

- (a) diffusion current keeps increasing
- (b) drift current remains constant
- (c) both the diffusion current and drift current remain constant.
- (d) diffusion current remains almost constant but drift current increases till both currents-become equal

3. The formation of depletion region in a p-n junction diode is due to (CBSE 2023)

- (a) movement of dopant atoms
- (b) diffusion of the electrons and holes
- (c) drift of electrons only
- (d) drift of holes only

4. If a p-n junction diode is reverse biased.

- (a) the potential barrier is lowered.
- (b) the potential barrier remains unaffected.
- (c) the potential barrier is raised
- (d) the current is mainly due to majority charge carriers.

5. (1) (a) A germanium crystal is doped with antimony. With the help of energy-band diagram, explain how the conductivity of the doped crystal is affected.

6. Briefly explain the two processes involved in the formation of a p-n junction.  
(c) What will the effect of (I) forward biasing, and (II) reverse biasing be on the width of depletion layer in a p-n junction diode? (CBSE 2023)
7. Draw energy band diagram for an n- type and p-type semiconductor at  $T > 0$  K. (CBSE 2023)
8. Explain the roles of diffusion current and drift current in the formation of the depletion layer in a p-n junction diode.
9. Name the device which converts an AC input signal into a DC output signal. Write the principle of working of the device.(CBSE 2022)
10. Explain the property of a p-n junction which makes it suitable for rectifying alternating voltages. Differentiate between a half-wave and a full-wave rectifier. (CBSE 2023)