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 1.5×10^{-16} m^{-3}. When it is doped with a trivalent dopant, hole concentration increases to 4.5×10^{22} m^{-3} .In the doped semiconductor, the concentration of electrons (n_e) will be (CBSE 2023)

(a) 3×10^{6} m^{-3}

(b) 5×10^{7} m^{-3}

(c) 5×10^{9} m^{-3}

(d) 6.75×10^{38} 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)