

**National Institute of Open Schooling**  
**Senior Secondary**  
**Lesson 28 – Semiconductors and Semiconducting Devices**  
**Worksheet No- 28**

- Q1.** In a matter we have solid, liquid and gas. Further solids are classified into three parts on the basis of energy bands i.e, ( $\Delta E=0$ ,  $\Delta E \leq 3$  eV,  $\Delta E > 3$  eV). Explain these types of solid with suitable diagram.
- Q2.** Diode is a semiconductor device which plays an important role in Electronic appliances. Find some diodes in your surroundings and draw the symbol of different types of diodes and what is the principle mechanism of those diodes.
- Q3.** What are majority carrier and minority carrier in N – type and P-type. How biasing affect the Majority carrier and minority carrier?
- Q4.** The resistivity of N-type germanium is 0.01 ohm meter at room temperature. Find the donor concentration if the mobility of electron is  $0.39 \text{ m}^2/\text{volt sec}$ .
- Q5.** Semiconductors are classified on the basis of purity and impurity. How you make compare these two types of semiconductors Explain briefly with diagram showing flow of electron and holes. Is semiconductor obey ohm's law?
- Q6.** n-type and p-type semiconductors have electrons and holes respectively. What you observe when n-type material is placed near with p-type material? Shall we find some useful device? If so, How? Explain p-n type diode with diagram.
- Q7.** A crystal of certain pure material becomes an electric conductor when EM radiation with  $\lambda$  shorter than 180nm is incident on it. What is the value of energy gap for this material?
- Q8.** The potential difference across a PN junction can be applied in two ways forward and reverse. Explain forward and reverse bias with suitable diagram.
- Q9.** An pure Ge has a resistivity of  $0.47 \Omega \text{ m}$ . if the mobility of electron is  $0.39 \text{ m}^2(\text{volt-sec})^{-1}$  and mobility of holes is  $0.19 \text{ m}^2(\text{volt-sec})^{-1}$ . Find intrinsic carrier concentration.
- Q10.** Draw a circuit diagram representing the biasing of a Light Emitting Diode. Explain the factors wave length of light, Intensity of light .Give two advantages of LED over the lamp.
- Q11.** Carbon (C) and Silicon (Si) both have tetra valency in their outermost shell. Comment how both Carbon (C) and Silicon (Si) differ with each other. Also give reasons why Silicon is used in Semiconductor devices?
- Q12.** A common base connection  $I_e=1\text{ma}$  and  $I_c=0.95\text{ma}$ . Calculate the value of  $I_v$ .