

Solids and Semiconductors

One mark questions

Q1. Draw a labelled diagram to show the circuit symbols of an N-P-N transistor.

Q2. What kinds of biasing are required to the collector and base of a transistor in a common emitter amplifier?

Q3. What is a solar cell and where is it used?

Q4. What can be the cause of sudden increase in the reverse current through junction diode?

Q5. Can we put pure semiconductors to any use?

Q6. Write a relation between n_i , n_e and n_h for pure semiconductor and impure semiconductor where symbols have their usual meaning.

Q7. Is valence band completely filled up in all conductors?

Q8. Write the condition under which forward current flows through the junction diode.

Q9. Does P-N junction diode act like a linear device under some condition?

Q10. At high temperature, which semiconductor is preferred out of Si, Ge and Te?

Two mark questions

Q1. Draw energy band diagram of P-type semi conductor and give brief explanation.

Q2. Draw energy band diagram of N-type semi conductor and give brief explanation.

Q3. What is barrier potential show with the help of a graph?

Q4. What is Zener voltage? Is it more than the barrier potential?

Q5. What is a zener diode? On what principle does it work?

Q6. What is light emitting diode? How does it work?

Q7. What do you mean by P-type semiconductor? Draw a necessary diagram to show the creation of hole.

Q8. What do you mean by N-type semiconductor? Draw a necessary diagram to show the creation of free electron.

Three mark questions

Q1. Distinguish between forward bias and reverse bias.

Q2. Distinguish between static resistance and dynamic resistance. Is junction diode ohmic in forward bias and reverse bias. Under specific conditions write expression for forward current and reverse current.

Q3. What do you mean by the word **characteristics** of a junction diode? By giving a suitable circuit diagram and the graph explain the forward bias characteristics of a P-N junction diode.

Q4. What do you mean by the word **characteristics** of a junction diode? By giving a suitable circuit diagram and the graph explain the reverse bias characteristics.

Q5. Explain the working of P-N junction diode as a full-wave rectifier.

Q6. Explain the working of P-N junction diode as a half-wave rectifier.

Q7. Write a brief note on electrical conduction in intrinsic semi conductors.

Q8. Explain the generation of holes in the intrinsic semiconductors on the basis of band theory of solids

Five mark questions

Q1. (a) Distinguish between conductors, insulators and semiconductors according to energy band theory. Draw the necessary diagrams.

(b) Why do we get a small current (in mA) through a P-N junction diode under reverse bias condition? In which direction does this current flow through the junction?

Q2. Draw a labelled circuit diagram of common emitter type transistor (N-P-N or P-N-P) as an amplifier, showing the biasing correctly. Write expressions for various gains of amplifier.

Q3. Draw a labelled circuit diagram of common base type transistor (N-P-N or P-N-P) as an amplifier, showing the biasing correctly. Write expressions for various gains of amplifier.

Q4. Derive an expression for electrical conductivity of extrinsic semiconductor in terms of number density and mobility of charge carriers.

Q5. Explain with the help of a labelled circuit diagram, the input properties of P-N-P or N-P-N transistor in common base configuration.

Q6. Explain with the help of a labelled circuit diagram, the output characteristics of P-N-P or N-P-N transistor in common base configuration.

Q7. Describe P-N-P or N-P-N transistor as an oscillator using common emitter configuration.

Q8. Discuss the input characteristics of common base configuration of P-N-P transistor.