Sample Paper

B. Tech. First Year (Section B)
Session: 2025-26
SUBJECT: Engineering Physics- A, Sub. Code- 3000A03AT015
First Assignment

UNIT I: SEMICONDUCTORS

1. Classify solids based on electrical conductivity. Explain with examples.
2. Explain the formation of energy bands in solids using the energy level approach. Draw neat diagrams.
3. Distinguish between conductors, semiconductors, and insulators based on energy band theory.
4. Define Fermi level. Explain the position of Fermi level in intrinsic semiconductors.
5. Derive the expression for carrier concentration in intrinsic semiconductors.
6. Explain n-type and p-type semiconductors with neat diagrams. Discuss how the Fermi level shifts in each case with change in impurity concentration and temperature.
7. Write short notes on:
   a) Law of mass action
   b) Charge neutrality condition
   c) Drift and diffusion currents in semiconductors

Second Assignment

UNIT II: SEMICONDUCTOR DIODE

1. Explain the formation of a p–n junction with the help of a neat diagram.
2. What is the depletion region in a p–n junction? Derive the expression for the potential barrier.
3. Draw and explain the energy band diagram of a p–n junction diode at equilibrium.
4. With neat diagrams, explain the forward and reverse biasing of a p–n junction diode.
5. Draw and explain the V–I characteristics of a p–n junction diode.
6. Write short notes on the following:
   a) Light Emitting Diode (LED)
   b) Solar Cell
   c) Photo Diode
7. Compare the characteristics of LED, Solar Cell, and Photo Diode in tabular form.