

22217

24225

3 Hours / 70 Marks

Seat No.

--	--	--	--	--	--	--	--

-
- Instructions* – (1) All Questions are *Compulsory*.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data, if necessary.
(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any FIVE of the following :** **10**
- a) Define resistivity. State its unit.
 - b) Define intrinsic and extrinsic semiconductor.
 - c) List dielectric materials (any four).
 - d) State the concept of piezo-electricity.
 - e) Give the classification of magnetic materials.
 - f) State the impurities for obtaining p-type and n-type semiconductor from Intrinsic semiconductor.
 - g) Give any two applications of micro-relays.

P.T.O.

- 2. Attempt any THREE of the following :** **12**
- a) Explain seekback effect and give its two applications.
 - b) Explain the requirements of good insulating material.
 - c) Sketch orientation of spins in paramagnetic, ferromagnetic, anti-ferromagnetic and ferrimagnetic material.
 - d) Suggest the relevant materials used in flexible and wearable antenna.
- 3. Attempt any THREE of the following :** **12**
- a) Draw and explain hysteresis loop in magnetic material.
 - b) Describe the breakdown in solid dielectric materials.
 - c) State and explain various factors affecting the resistivity of electrical materials.
 - d) Compare P-type semiconductor with N-type semiconductor on the basis of –
 - i) Majority charge carrier
 - ii) Minority charge carrier
 - iii) Impurity material
 - iv) Fermi-level position in energy band diagram
- 4. Attempt any THREE of the following :** **12**
- a) Write two properties for the given dielectric materials:
 - i) Polythene
 - ii) Glass
 - iii) Wood
 - iv) Silk
 - b) Differentiate between anti-ferromagnetism and ferrimagnetisms.
 - c) Explain the concept of field emission and give its two applications.

- d) Give various photoemissive materials and suggest relevant combination of material for LED to emit Red and Green colour.
- e) Explain the following in brief :
 - i) Diffusion
 - ii) Hall effect

5. Attempt any TWO of the following : 12

- a) Explain the properties of magnetic materials with examples:
 - i) Ferromagnetic
 - ii) Paramagnetism
 - iii) Diamagnetism
- b) State the different modes of electron emission in metal. Explain any one mode of emission.
- c) Explain the following materials used for fabrication of semiconductors:
 - i) Substrate
 - ii) Junction coating
 - iii) Packaging.

6. Attempt any TWO of the following : 12

- a) Explain superconductivity and give any four applications of it.
 - b) State any two properties and application of following material:
 - i) Rubber
 - ii) Transformer oil
 - iii) Mica
 - c) Explain magnetostriction property. Explain generation of ultrasonic using magnetostriction.
-