

22217

11920

3 Hours / 70 Marks

Seat No.

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- 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.

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| 1. Attempt any FIVE of the following : | 10 |
| (a) Define superconductivity. | |
| (b) List any two examples of ferroelectric materials. | |
| (c) Give classification of magnetic materials. | |
| (d) Draw energy level diagram of conductor & insulator. | |
| (e) List any two applications of photoelectric emission. | |
| (f) List any two trivalent & pentavalent impurity materials. | |
| (g) Give any two applications of micro relays. | |
| 2. Attempt any THREE of the following : | 12 |
| (a) Explain how energy levels are formed in a materials. | |
| (b) Explain the concept of piezo-electricity & state its any one application. | |
| (c) Explain the properties of dielectric materials. | |
| (d) Explain the concept of thermoelectric effect & give any two materials for thermocouples. | |
| 3. Attempt any THREE of the following : | 12 |
| (a) Explain the process of photoelectric emission. | |
| (b) Explain diffusion (current) in a semiconductor. | |
| (c) Explain the principle of stimulated emission & radiation in LASER. | |
| (d) Differentiate between anti-ferromagnetism & ferrimagnetisms. | |

- 4. Attempt any THREE of the following :** **12**
- (a) Suggest the relevant materials used in flexible & wearable antenna.
 - (b) Explain the characteristics of good insulating materials.
 - (c) Explain the concept of magnetostriction effect & state its application.
 - (d) Suggest any one suitable material and any one application for :
 - (i) thermionic emission
 - (ii) secondary emission
 - (e) Write one application for the given dielectric materials :
 - (i) Mica
 - (ii) Bakelite
 - (iii) Rubber
 - (iv) Polythene
- 5. Attempt any TWO of the following :** **12**
- (a) Explain the effect of temperature on conductivity of metals.
 - (b) On the basis of given properties, identify the magnetic materials
 - (i) Permanent magnetic dipole
 - (ii) Diamagnetism
 - (iii) Paramagnetism
 - (iv) Ferromagnetism
 - (c) Write one property for the given dielectric material.
 - (i) Ceramic
 - (ii) Porcelain
 - (iii) Poly Vinyl Chloride (PVC)
 - (iv) Cotton
 - (v) Silk
 - (vi) Glass
- 6. Attempt any TWO of the following :** **12**
- (a) Describe Hall effect & state its applications.
 - (b) Describe the magnetization curve.
 - (c) State any four materials used in fabrication of semiconductor device & describe its need.
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