

## ELECTRICAL ENGINEERING MATERIALS

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) What are the effects of temperature on resistance of metal, conducting alloy and semi-conductors ? 3
- (b) Write down the properties of low resistivity material and where such materials are used ? 6
- (c) Compare the properties of copper as conductor material with manganin and chromium. 5
2. (a) What is thermocouple ? Write two examples. 4

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- (b) The resistance of armature winding of a motor at  $0^{\circ}\text{C}$  is 80 ohm. Find the resistance at  $40^{\circ}\text{C}$ , if the temperature co-efficient of copper at  $0^{\circ}\text{C}$  is 0.0043. 6
- (c) What is super conductivity ? Write the application of super conducting materials. 4
3. (a) Define the following terms : 6  
Coercivity, permeability and residual magnetism.
- (b) Compare soft magnetic material with hard magnetic material with neat hysteresis loop diagram. 4
- (c) Explain hysteresis with the help of hysteresis loop. 4
4. (a) State the properties of good insulating materials. 6
- (b) Classify the insulating material on the basis of physical state with example. 4
- (c) Mention the field of application of the following insulating materials. Give reason for each : 4  
(i) Mica and  
(ii) wood.

5. (a) What is semi-conductor ? Explain the process of conduction in — 8  
(i) P-type and n-type semi-conductor  
(ii) Intrinsic and extrinsic semi-conductor.
- (b) Discuss the advantages of semi-conductor and field of application for use in industry. 6
6. (a) Describe the etching technique of P.C.B. 5
- (b) What is fuse ? Write down the properties of fuse material. 4
- (c) What is solder ? State the application of different fluxes. 5
7. Write short notes on :  
(a) Destructive test 5  
(b) H.R.C fuse 5  
(c) A C S R conductor. 4