

EE - 302
B.E. III Semester Examination, December 2014
Electrical Engineering Materials
Time : Three Hours

- Note:** i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice. **Maximum Marks : 70**
ii) All parts of each questions are to be attempted at one place.
iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.
iv) Except numericals, Derivation, Design and Drawing etc.

1. a) What are superconductors?
b) Write the various properties of copper.
c) Explain the principle of a thermocouple.
d) Explain the factors which change the resistivity of a conducting material.

OR

A coil of copper wire has a resistance of 250 ohms at 15°C. Find its temperature when its resistance is 300 ohms.

2. a) What is meant by doping? How does it affect a semiconductor?
b) Explain Hall Effect and give applications of Hall Effect.
c) Explain n-type and p-type semiconductors.
d) Explain a p-n junction? Discuss formation of p-n junction. Also explain biasing.

OR

The resistivity of the pure germanium at room temperature is 0.47 ohm-m. Find out the carrier density of germanium at room temperature for the electron mobility = 0.38 m²/volt-sec and hole mobility = 0.18 m²/volt-sec.

3. a) Differentiate hard and soft magnetic material?
b) Explain the hysteresis loop of a magnetic material.
c) What are eddy current losses.
d) Distinguish between ferromagnetic, paramagnetic and diamagnetic materials, mentioning at least one example of each.

OR

State the advantages and disadvantages of alloying steel with silicon for use as magnetic materials in transformer and electric machines.

4. a) Draw the equivalent circuit of an imperfect insulator.
b) What is polarization? Explain.
c) Explain the terms dielectric constant and dielectric loss.
d) Discuss the electrical characteristics of insulating materials.

OR

Discuss classification of insulating materials on the basis of physical and chemical structure.

5. a) Discuss important properties and uses of glass and glass product.
b) Give the properties and applications of mica and PVC.
c) What are plastics? Give their classification.
d) Classify the different types of insulating materials with reference to their limiting safe temperatures for use.

OR

Write short notes on:

- i) General properties of transformer oil ii) Fibrous insulating materials
