

No. of Questions :5]

Roll No

EX - 402**B.E. IV Semester**

Examination, June 2015

Electrical and Electronics Materials*Time : Three Hours**Maximum Marks : 70*

- te: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
- 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.
- a) Explain the essential properties of low resistivity materials.
- b) What is super conductivity? Explain Silsbee effect.
- c) A coil of copper wire has a resistance of 50 ohms at 20°C. Calculate its resistance at 60°C. Given that temperature. Co-efficient of 0°C is 0.00427 per °C.
- d) What are the factors those affect the resistance of the conducting materials. Describe in detail with temperature co-efficient equation.

OR

The critical field for Niobium is 1×10^5 Amp./m. at 8 K and 2×10^5 Amp./m. at 0 K. Calculate the critical temperature of the material.

[2]

2. a) What is the difference between the insulator and dielectric?
- b) A condenser is connected for 0.25 sec. across a 220 V supply, the current being kept steady at 0.22 A. Calculate its charge and capacitance.
- c) What is Piezoelectricity? Explain the effects of piezoelectricity.
- d) How testing of dielectric strength of transformer oil is done. Describe main features of insulating liquids.

OR

Explain the term dielectric loss and loss angle with the help of a phasor diagram. How frequency and temperature affect the loss tangent of dielectric.

3. a) What do you mean by intrinsic and extrinsic semiconductor materials?
- b) What are the applications of semi conducting materials?
- c) Explain the following terms regarding semiconductors:
 - i) N type and P type impurities
 - ii) Generation and recombination
 - iii) Doping
- d) Explain the Hall effect and derive the expression for Hall voltage and Hall angle.

OR

The resistivity of a semiconductor was known to be 0.00893 Ohm-m at room temperature. The flux B_z in the Hall model was 0.5 Weber/m². Calculate the Hall angle for a Hall coefficient of $3.66 \times 10^{-4} \text{ m}^3/\text{C}$.

[3]

4. a) What is hysteresis loop and what information does it give about a magnetic material. Explain with neat sketches.
- b) What are the basic requirements of optical communication? How light can be transmitted in optical fiber cables.
- c) What do you understand by magnetostriction; also explain the factors affecting permeability and hysteresis loss?
- d) An iron ring of circular cross-section 10 cm² has a mean circumference of 1 m. The relative permeability of the ring material is 1000. If the ring is uniformly wound with 1000 turns. Determine the current required to produce a flux of 0.01 wb.

OR

Explain the term diamagnetic, paramagnetic and ferromagnetic, with reference to magnetic dipoles of atoms.

5. a) What are the advantages of integrated circuits over discrete circuits?
- b) Explain BJT with basic structure and symbol.
- c) Explain the following:
 - i) IC resistors
 - ii) IC capacitors
- d) Explain the steps involved in the fabrication of ICs.

OR

Define and explain the FET parameters and Establish the relation between them.
