

## EX - 402

**B.E. IV Semester** Examination, December 2014

### Electrical and Electronics Materials

*Time : Three Hours*

**Maximum Marks : 70**

- Note:** 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.

#### Unit - I

1. a) Give classification of conductors in brief?
- b) Explain the characteristics and properties of resistor materials.
- c) Discuss that the soft and hard superconductor materials differ from each other.
- d) Enumerate the characteristics of conductor materials for use as heating elements?

OR

Calculate the resistance of a wire at 50°C which is 300m long and has an area of cross section of 25 mm<sup>2</sup>. The wire is made of aluminium. Resistivity of aluminium at 15°C is 2.7 ohm-m. Temperature coefficient of aluminium is 0.004 ohm/degree C at 0°C?

#### Unit - II

2. a) Write two main properties of dielectric material?
- b) Write two main factors effects the insulation of transformer oil?
- c) Explain molecular theory of polarization.
- d) Describe the effect of temperature on dielectric constant? What is dielectric loss? Derive the formula used?

OR

A piezoelectric crystal having thickness of 2 mm and voltage sensitivity of 0.055 V-m/N is subjected to pressure of 1.25 MN/m<sup>2</sup>. Calculate the voltage output. If the permittivity of the material is  $40.6 \times 10^{-12}$  F/m, calculate its charge sensitivity?

#### Unit - III

3. a) What do you understand by photo diode?
- b) What is the hall effect principle? Explain in brief.
- c) Distinguish between intrinsic and extrinsic semiconductor. What do you mean by Zener and Avalanche breakdown?
- d) Explain the function and applications of temperature sensitive elements?

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OR

Name the different types of semiconductor materials? Also write merits, demerits and application of semiconductor materials in electrical and electronics engineering?

**Unit - IV**

4. a) What do you understand by term Fluorescent?  
b) What is curie temperature in brief?  
c) Draw initial magnetization curve and hysteresis loop in coercivity and retentivity portion? Explain in brief?  
d) What is Hysteresis? Explain the behavior of hard magnetic material and soft magnetic material with the help of B-H curve?

OR

What are the impurities in Ferro-magnetic material and discuss the factors responsible for loss magnetism?

**Unit - V**

5. a) What are the advantages of Integrated circuits?  
b) Give various types of Integrated circuits packing?  
c) Explain any two process in the manufacturing of integrated circuits?  
d) Write short note on fabrication of:  
i) BJT  
ii) Resistor and capacitor

OR

Explain monolithic design?

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