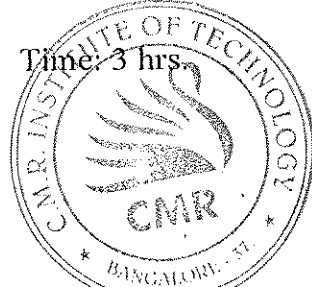


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10EE666

**Sixth Semester B.E. Degree Examination, June/July 2016**  
**Electrical Engineering Materials**



Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.**  
**2. Support your answers with relevant diagram and Equations if necessary.**

**PART – A**

- 1 a. With neat sketches explain Fermi Dirac distribution at different temperatures. (08 Marks)
- b. Explain different types of materials used for the manufacturing of electric resistors. (08 Marks)
- c. Calculate the resistance of a wire at 50°C which is 300 m long and has an area of cross section of 25 mm<sup>2</sup>. The wire is made up of aluminum; resistivity of aluminum at 15°C is 2.78Ωm. Temperature coefficient of aluminum is 0.004Ω/degree C at 0°C. (04 Marks)
- 2 a. Explain the different types of semi-conductors. (08 Marks)
- b. Write a note on origin of permanent magnetic dipole moments. (08 Marks)
- c. The following data are given for intrinsic germanium at 300K.  $n_i = 2.4 \times 10^{19} / m^3$ ,  $\mu_e = 0.39 m^2 v^{-1} s^{-1}$ ,  $\mu_n = 0.19 m^2 v^{-1} s^{-1}$ . Calculate the resistivity of the sample. (04 Marks)
- 3 a. What is polarization? List the different types of polarization and explain any two types in detail. (10 Marks)
- b. Write a note on the following: i) Dipolar relaxation ii) Dielectric loss (10 Marks)
- 4 a. Classify insulating materials on the basis of physical and chemical structure and explain any four in brief. (10 Marks)
- b. Why oil is used in transformer? With a neat diagram explain a method to test dielectric strength of transformer oil. (10 Marks)

**PART – B**

- 5 a. With a neat diagram explain with working of solar photo voltaic cell and also draw the equivalent circuit and V-I characteristics. (12 Marks)
- b. Explain the following : i) Cold mirror Coatings ii) Heat Mirror Coatings. (08 Marks)
- 6 a. Explain atomic absorption spectroscopy with a neat diagram. (10 Marks)
- b. Explain the concept of Nuclear Magnetic Resonance (NMR), with the help of NMR spectrometer. (10 Marks)
- 7 a. Explain the phenomenon of Piezo electricity. Discuss essential properties and applications of piezoelectric materials. (08 Marks)
- b. What is rheology? Explain magneto rheological fluid with their modes of operation. (08 Marks)
- c. Write a brief note on shape memory alloy's. (04 Marks)
- 8 a. List the applications of ceramics as conductors and explain any four. (08 Marks)
- b. What are plastics? Explain AC and DC electrical properties for the same. (10 Marks)
- c. Write any two differences between thermoplastics and thermosetting plastics. (02 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.