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10EE666

**Sixth Semester B.E. Degree Examination, June/July 2018**  
**Electrical Engineering Materials**

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.**

**PART – A**

- 1 a. With neat sketches, explain Fermi Dirac Distribution at different temperatures. (08 Marks)  
b. With usual notations prove that  $R_T = R_t [1 + \alpha_t (T - t)]$  (08 Marks)  
c. A copper wire and an aluminium wire have same length and resistance. If same current passes through a copper and aluminium wires have same length and resistance, which wire will have higher temperature rise? Give justification. (04 Marks)
- 2 a. Draw a typical hysteresis loop for a ferromagnetic materials and explain. Show the residual magnetism and coercive force on a loop and define them. (10 Marks)  
b. Define Hall effect. With neat sketch, explain the concept of hall effect and arrive at an equation for Hall voltage  $V_H$ . (10 Marks)
- 3 a. Write short note on the following: i) Dipolar relaxation ii) Dielectric loss. (10 Marks)  
b. List the characteristics of good insulating material and Dielectric material. (06 Marks)  
c. List out the properties of  $SF_6$  gas. (04 Marks)
- 4 a. Explain the procedure for testing the dielectric strength of transformer oil with neat sketch. (08 Marks)  
b. What is Polarization? Explain the different types of polarization (08 Marks)  
c. Write a note on Dielectric loss. (04 Marks)

**PART – B**

- 5 a. Explain the working of solar photo – voltaic cell with a neat sketch. Also draw the equivalent circuit and VI characteristics of Solar PV cell. (10 Marks)  
b. With a neat sketch explain the basic working principle of fuel cells. (05 Marks)  
c. Write short note on Cold Mirror coating. (05 Marks)
- 6 a. With a neat sketch. Explain Electron Microscopy. (10 Marks)  
b. Explain the concept of NMR with the help of NMR spectro-meter. (10 Marks)
- 7 a. What is piezo- electricity? Explain the construction and working of piezo-electric device. (08 Marks)  
b. Define Magnetostriction. Explain different types of magnetostriction with the help of necessary graphs with applications. (10 Marks)  
c. Define Ferromagnetic curie temperature. (02 Marks)
- 8 a. What are the general properties of ceramics and how it is applicable to capacitor? (08 Marks)  
b. Write short note on Rubber. (05 Marks)  
c. Explain the Thermoplastic and Thermosetting materials and give example for each. (07 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.