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**Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020**

**Electrical Engineering Materials**

Time: 3 hrs.

Max. Marks:100

**Note:** Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART - A**

- 1
  - a. With usual notations, prove that  $RT = R_t [1 + \alpha_t (T - t)]$ . (08 Marks)
  - b. Explain the different materials that can be used for lamp filaments. (06 Marks)
  - c. What are the general properties of the conducting materials? (06 Marks)
- 2
  - a. Draw the typical hysteresis loop for a ferromagnetic material. Show which part is reversible. Define residual magnetism. (08 Marks)
  - b. Write a short note on Hall Effect. (06 Marks)
  - c. Explain Magnetostriction. (06 Marks)
- 3
  - a. What is Polarization? Explain i) Ionic polarization ii) Dipolar polarization. (08 Marks)
  - b. Write a note on dipolar relaxation. (06 Marks)
  - c. List the characteristic of good insulating materials. (06 Marks)
- 4
  - a. Classify and list the solid, liquid and gaseous insulating materials. Suggest where these insulators are used in electrical field applications. (08 Marks)
  - b. With a neat sketch, explain the procedure for testing of dielectric strength of transformer oil. (06 Marks)
  - c. List the properties of SF<sub>6</sub> gas. (06 Marks)

**PART - B**

- 5
  - a. With a neat sketch, explain the working of solar photovoltaic cell and draw the V – I characteristics. (08 Marks)
  - b. What are the physical and chemical properties of materials used for solar cell? (06 Marks)
  - c. With a neat sketch, explain the working of fuel cell. (06 Marks)
- 6
  - a. With a neat sketch, explain electron microscopy. (08 Marks)
  - b. Explain with a suitable diagram, the construction and working of NMR spectrometer. (06 Marks)
  - c. With a neat diagram, explain Monochromometer and Detector. (06 Marks)
- 7
  - a. What is Piezo – electric? Explain which are the materials used in Piezo – electric and list the applications of Piezo – electric materials. (08 Marks)
  - b. Explain the ferromagnetic materials. (06 Marks)
  - c. Write a note on Smart hydrogels. (06 Marks)
- 8
  - a. What are the general properties of ceramic materials and how these are applicable to capacitors? (08 Marks)
  - b. Distinguish between thermosetting and thermoplastic materials. (06 Marks)
  - c. What are the types of rubber and give the applications of each type? (06 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.

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