

Roll No.

Total No. of Questions : 09]

[Total No. of Pages : 02

Paper ID [EE208]

(Please fill this Paper ID in OMR Sheet)

B.Tech. (Sem. - 4th)

ELECTRICAL ENGINEERING MATERIALS (EE - 208)

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

Section - A

Q1)

(10 x 2 = 20)

- a) What is meant by polarisation?
- b) Define complex permittivity.
- c) How can a lossy capacitor be represented? Define term 'loss angle'.
- d) State applications of superconductors.
- e) What is meant by Magnetic Anisotropy?
- f) State characteristics of magnetically soft materials.
- g) What are eddy current losses?
- h) What is meant by spontaneous magnetization?
- i) Give significance of contact potential.
- j) What are thermistors?

Section - B

(4 x 5 = 20)

- Q2)** Discuss the effects of 'temperature' and 'frequency of applied field' on the dielectric constant of materials.
- Q3)** What is meant by dipolar relaxation? Show that it leads to a complex dielectric constant of the material and deduce an expression for the same.
- Q4)** Name the metals and alloys for making fuses. Derive an expression for the heat developed in a current carrying conductor.
- Q5)** Discuss 'mean free path' of an electron and deduce an expression for the same.
- Q6)** Write a detailed note on 'spontaneous magnetisation' in ferromagnetic materials.

Section - C

(2 x 10 = 20)

- Q7)** (a) Discuss the different components of electric polarization and derive a general expression for the static dielectric constant of a polyatomic gas.
(b) A coil of copper wire has a resistance of 250 ohms at 15°C. Find its temperature when its resistance is 300 ohms.
- Q8)** (a) With the use of simplified model, derive expression for relationship between susceptibility against the temperature for antiferromagnetic materials above the neel temperature.
(b) Why is carbon preferred for brushes in electrical machines?
- Q9)** Write short notes on any two of the following:
(a) Magnetic material for electrical devices.
(b) Orientational polarization.
(c) Ferroelectric materials.

