

5E1767	Roll No. _____	Total No. of Pages : 2
	5E1767	
	B.Tech. V- Sem. (Main&Back) Examination, November/December - 2025 Electrical Engineering 5EE3-01 Electrical Materials	

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No.205)*

PART- A

(Answer should be given up to 25 words only)

All questions are compulsory.

(10×2=20)

1. Define skin effect.
2. What is the Hall effect in electrical materials?
3. Differentiate between mono-atomic and poly-atomic dielectric materials.
4. What is polarization in dielectric materials?
5. State any two properties of ferroelectric materials.
6. What are crystalline defects in solids?
7. Define the dielectric constant.
8. What is meant by electronic polarizability?
9. Define Piezoelectricity.
10. Write the scope of studying electrical materials

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×4=20)

1. Explain temperature dependence of resistivity in solids.
2. Describe the classical theory of electrical conduction in solids.
3. Write a short note on dielectric losses.
4. Explain internal field in solids and liquids with suitable examples.
5. Discuss the frequency dependence of electronic and ionic polarizability.
6. Describe the zero resistance and Meissner effect.
7. Explain the Carrier density and energy gap.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions.

(3×10=30)

1. Discuss in detail dielectric constant of mono atomic gases and poly atomic molecules.
 2. Explain dielectric properties of insulators in static and alternating fields.
 3. Describe the properties and applications of ferroelectric materials and piezoelectricity.
 4. Discuss the classical theory of thermal conduction in solids along with Hall effect.
 5. Explain magnetic properties and basics of superconductivity in electrical materials
-