

Roll No. ....

**3245**

**B. Tech. 5th Semester (EE) (Elective - II)  
Examination – March, 2021**

**ELECTRICAL ENGINEERING MATERIALS**

Paper : OEC-EE-01-G

**Time : Three Hours ] [ Maximum Marks : 75**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is **compulsory**. All questions carry equal marks.

- 1.** (a) Explain the factors affecting resistivity of electrical materials. **2.5 X 6**  
(b) Explain the significance of loss tangent.  
(c) Classify Magnetic materials.  
(d) State the different types of semiconductors.  
(e) Explain thermal properties of metals.  
(f) Explain the Einstein relation in brief.

**UNIT - I**

2. Explain the following : 15  
(a) Thermionic emission  
(b) Field emission
3. (a) Deduce the equation of motion of an electron. Further derive the equation of current carried by electron. 7.5  
(b) Explain the effect of temperature on electrical conductivity of metals. 7.5

**UNIT - II**

4. Explain the following : 15  
(a) Ferroelectricity  
(b) Piezoelectricity
5. (a) Explain dielectric properties of polymeric system. 7.5  
(b) Explain the requirements of good insulating materials. 7.5

**UNIT - III**

6. Explain the following : 15  
(a) Diamagnetism  
(b) Para magnetism
7. (a) Describe the term magnetic resonance. 7.5  
(b) Explain the factors affecting the hysteresis loss. 7.5

**UNIT - IV**

8. (a) Write a short note on Hall Effect. 7.5  
(b) Write a note on diffusion and deduce the equation of total current density of electrons. 7.5
9. Explain the conductors, semiconductors and insulators with respect to the conduction and valence bands. 15