B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E. **Semester: VI**
Branch: Institutional Elective **Duration: 3 hrs.**
Course Code: 19EC6OE1EM **Max Marks: 100**
Course: Electronic Engineering Materials **Date: 25.09.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1 a) Write a short note on classification of engineering materials with example. **07**

b) A reaction takes 500min at 10^0 C for completion, it takes 1 min at 80^0 C. Find the time it would take at 40^0 C. **07**

c) Prove that the entropy of mixing equal number of two different kinds of atoms on one mole of fixed atomic sites is 5.76 J/(mol K) **06**

UNIT - II

2 a) A metal is having electrical resistivity and electron mobility of 5.8×10^{-8} (Ω m) and 0.002 m^2/V s respectively. Calculate the Hall voltage for a metal that is 30mm thick for a current of 25A and a magnetic field of 0.6 tesla (imposed in a direction perpendicular to the current). **10**

b) Describe the factors that influence the carrier mobility with necessary characteristic curve. **10**

OR

3 a) Consider a parallel plate capacitor having an area of 5.35×10^{-4} m^2 and plate separation of 2×10^{-3}m across with a potential of 12V is applied. If a material having a dielectric constant of 6 is positioned within the region between the plates. Find the following. **10**
  i) The capacitance
  ii) The magnitude of charge stored on each plate.
  iii) The dielectric displacement D
  iv) The polarization

b) With necessary diagram, write down the short note for following topic **10**
  i) Ferroelectricity
  ii) Piezoelectricity

UNIT - III

4 a) Discuss photoconductivity and show that the free carrier concentration increases significantly by irradiation of light. **10**

b) Explain the basic concept of the optical property. Discuss the method used to measure the bandgap of the prepared semiconductor material with relevant equations and plot. **10**

UNIT - IV

5 a) Write the deposition process step by step for growth of thin film using spin coat method with suitable schematic. **10**

b) With relevant diagram explain the process of thermal evaporation for depositing thin films. **10**

UNIT - V

6 a) Cu_2SnS_3 thin films are prepared using spin coating. Identify the tool used for measuring the resistivity and Hall coefficient and describe the working process of that tool. **10**

b) Discuss the working principle of X-ray diffraction techniques. Write the significance of Miller indices value. **10**

OR

7 a) CIGS thin films are deposited using vacuum method. Identify the characterization tool which is used for surface morphology of the films and describe the working of that tool. **10**

b) With the neat diagram, explain the working of TEM technique and also mention the advantage and disadvantage of the TEM technique. **10**

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