

2054

M.E. (Mechanical Engineering)-Second Semester
MME-203: Advances in Engineering Materials

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, selecting atleast two questions from each Unit.

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UNIT-I

- I. a) How the presence of impurities or alloying elements can modify the properties of a material by introducing structural defects?
b) Explain residual stress measurement methods. (5,5)
- II. a) Explain the image formation system in the scanning electron microscope.
b) Explain DTA, DSC and TGA technique using a case study. (5,5)
- III. a) Write the significance of backscattered electron in SEM.
b) Write various modes of operations in TEM? And explain the electron diffraction method in imperfect crystals using TEM. (5,5)
- IV. a) Write the possibilities and limitations of the optical microscope.
b) Discuss the image interpretation and importance of STM. (5,5)

UNIT-II

- V. What are the factors that can lead to polymer degradation and reduced mechanical properties? (10)
- VI. a) Differentiate between artificial and synthetic materials.
b) How nanomaterials are utilized in energy storage devices? (5,5)
- VII. a) What are the challenges in processing of SMAs?
b) Explain the importance of class transition temperature. (5,5)
- VIII. a) What are the unique properties of Teflon (PTFE) that make it useful in biomedical applications?
b) What is intelligent material? Write their applications and development. (5,5)

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