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Total No. of Questions : 08

M.Tech. (ME) (2017 Onwards) (Sem.–1)

ADVANCED ENGINEERING MATERIALS

Subject Code : MTME-101

M.Code : 74715

Time : 2 Hrs. Max. Marks : 50

INSTRUCTIONS TO CANDIDATES :

1. **Attempt any FIVE question(s), each question carries 10 marks.**

1. a) Define the difference between elastic and plastic deformation in terms of the effect on the crystal lattice structure.

   b) How do grain boundaries contribute to the strain hardening phenomenon in metals?

2. a) What is meant by the term interface in the context of composite materials?

   b) Identify some of the important properties of fiber reinforced plastic composite materials.

3. a) What are the general mechanical properties of ceramic materials?

   b) What is the feature that distinguishes glass from the traditional and new ceramics?

4. a) What is tempered glass? How does it produced? Why is tempered glass considerably stronger in tension than annealed glass?

   b) How does toughening occur in a ceramic materials when it is reinforced with suitable fibers?

5. a) What are the characteristics of E-glass?

   b) What are the factors that determine the mechanical properties of GRP products?

6. Describe and explain the following smart materials :

   a) Shape Memory Alloys (SMA)

   b) hydromorphic polymers

   c) Hydrocarbon Encapsulating Polymers

7. a) How do surfactants influence the growth of nanoparticles? Explain.

   b) Give 3 examples of (physical and/or chemical) processes that can be used to produce nanoscale powders.

8. Write short notes on the following :

a) Properties of materials required at low temperature

b) Application of smart materials.