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Total No. of Pages : 02

Total No. of Questions : 08

M.Tech. (Mechanical Engineering) / (Manufacturing Engineering & Automation) (Sem.–1) ADVANCED ENGINEERING MATERIALS Subject Code : MTME-101 M.Code : 91562

Date of Examination : 14-01-23

Time: 3 Hrs.

Max. Marks: 100

INSTRUCTIONS TO CANDIDATES :

- 1. Attempt any FIVE questions out of EIGHT questions.
- 2. Each question carry TWENTY marks.
- 1. a) Why there is a need of advanced materials. Justify with suitable examples. (10)
 - b) Give brief classification of various engineering materials and their applications by giving suitable examples? (10)
- 2. a) Define shape memory alloy, their properties and applications by giving suitable examples. (10)
 - b) Give classification of high temperature materials and material preferred for steam turbine casing of jet engines by giving suitable examples? (10)
- 3. a) How to differentiate between matrix and dispersed phases in a composite material? (10)
 - b) For some ceramic materials, why does the thermal conductivity first decrease and then increase with rising temperature? (10)
- 4. A continuous and aligned glass fiber-reinforced composite consists of 40 vol% of glass fibers having a modulus of elasticity of 69 GPa and 60 vol% of a polyester resin that, when hardened, displays a modulus of 3.4 GPa. Determine: (20)
 - a) The modulus of elasticity of this composite in the longitudinal direction. (10)
 - b) If the cross-sectional area is 250 mm² and a stress of 50 MPa is applied in this longitudinal direction, compute the magnitude of the load carried by each of the fiber and matrix phases. (10)

5.	a)	Explain in detail the latest development in materials used for biomedical applied	cations.
			(10)
	b)	What are the general mechanical properties of ceramic materials?	(10)
6.	a)	Define nano-materials, and their physical and mechanical properties.	(10)
	b)	What are the possible applications of CNTs for pressure and gas sensors? Exp principle with a neat diagram.	lain the (10)
7.	Wı	rite a short note on any two of the following :	
	a)	Intelligent materials for biomedical applications.	
	b)	Laminated composites	
	c)	Hardness and toughness of engineering materials (1	0+10)
8.	a)	Explain with a neat sketch, any process of manufacturing metal matrix composition	sites. (10)
	b)	What is the feature that distinguishes glass from traditional and new ceramics?	(10)

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.