U.S.N.										

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

Autonomous Institute Affiliated to VTU

May / June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VIII**

Branch: Mechanical Engineering **Duration: 3 hrs.**

Course Code: 22ME8PEAMP **Max Marks: 100**

Course: Advanced Materials and Processing

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

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Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

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			UNIT - I	CO	PO	Marks
1	a)		Discuss detailed classification of ceramics	CO1	PO1	**10**
	b)		Explain the process of Precipitation Hardening	CO1	PO1	**10**
			OR			
2	a)		Distinguish between (i) Plastic deformation and elastic deformation (ii) Slip and Twinning	CO1	PO1	**10**
	b)		Explain the process of Dispersion Hardening	CO1	PO1	**10**
			UNIT - II			
3	a)		Elaborate the detailed classification of Titanium alloys	CO2	PO1	**10**
	b)		Highlight the various applications of titanium alloys	CO2	PO1	**10**
			OR			
4	a)		Discuss the purpose and various techniques of heat treatment for titanium alloys	CO2	PO1	**10**
	b)		Explain the various considerations while machining titanium alloys	CO2	PO1	**10**
			UNIT - III			
5	a)		Classify the composite materials based on matrix and based on reinforcement materials quoting appropriate examples	CO3	PO1 PO2	**10**
	b)		Discuss the fabrication procedure for laminates	CO3	PO1 PO2	**10**
			OR			

	6	a)	Discuss the Squeeze casting method of producing MMC with a neat sketch	CO3	PO1 PO2	**10**
		b)	(i). Calculate the longitudinal modulus and tensile strength of a unidirectional composite containing 55 percent by volume of Sisal fibers in epoxy matrix. The modulus and strength of fiber is 30 GPa and 600 MPa respectively and the same for matrix is 3.5 GPa and 100 MPa respectively. Find the fraction of load taken by fibers in the composite (ii). A metal-Matrix composite is made from a Boron fibre reinforced in Aluminium alloy. To form the Boron fibre, a Tungsten wire (r=10 μm) is coated with Boron, giving a final radius of 75μm. The Aluminium alloy is then bonded around the Boron fibres, given a volume fraction of 0.65 for the Aluminium alloy. Assuming that *rule-of-mixtures* applies also to ternary mixtures; calculate the effective tensile elastic modulus of composite material under iso-strain conditions. Given $E_{Tungsten}$ = 410GPa; E_{Boran} = 379GPa and $E_{Aluminium}$= 68.9GPa.	CO3	PO1 PO2	**10**
			UNIT - IV			
	7	a)	Discuss plasma arcing method of producing Nano materials with neat sketch	CO4	PO1	**10**
		b)	Discuss sol- gel synthesis w.r.t. Nano particles	CO4	PO1	**10**
			OR			
	8	a)	Discuss the advantages and disadvantages of carbon nanotubes	CO4	PO1	**10**
		b)	Explain the characterization of nanoparticles using XRD	CO4	PO1	**10**
			UNIT - V			
	9	a)	Discuss ANY FIVE coatings for specific applications	CO5	PO1	**10**
		b)	Discuss ANY FIVE factors needed to be considered while selecting coating materials	CO5	PO1	**10**
			OR			
	10	a)	Discuss the merits and demerits of various coating techniques	CO5	PO1	**10**
		b)	List various surface film coating characterization / evaluation methods and explain any three in brief	CO5	PO1	**10**

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