U.S.N.										

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

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Mechanical Engineering **Duration: 3 hrs.**
Course Code: 19ME3DCMSM **Max Marks: 100**
Course: Material Science & Metallurgy

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

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.

			UNIT - I	*CO*	*PO*	Marks
1	a)		Compare and contrast slip and twinning processes in materials.	*CO1*	*PO1*	**06**
	b)		State the various factors affecting diffusion.	*CO1*	*PO1*	**06**
	c)		Sketch and explain various stages of ductile fracture in aluminum.	*CO1*	*PO1*	**08**
			OR			
2	a)		Discuss Fick's laws of diffusion.	*CO1*	*PO1*	**10**
	b)		Explain creep behavior in materials with the help of a creep curve. State the factors affecting creep.	*CO1*	*PO1*	**10**
			UNIT - II			
3	a)		State the Hume – Rothery rules governing the formation of solid solutions.	*CO2*	*PO1*	**05**
	b)		Discuss the salient points of Gibb's phase rule.	*CO2*	*PO1*	**05**
	c)		Explain with neat sketch any one type of eutectic phase diagram.	*CO2*	*PO1*	**10**
			UNIT - III			
4	a)		Draw a neat diagram of iron – iron carbide equilibrium diagram labeling all the salient points. Discuss the various micro constituents identified in Fe-FeC_3 diagram.	*CO3*	*PO1*	**12**
	b)		Explain TTT diagram for eutectoid steel. Illustrate.	*CO3*	*PO1*	**08**
			UNIT - IV			
5	a)		Define carburizing. Explain different types of carburizing surface treatment processes done on high alloy steels.	*CO4*	*PO1*	**10**
	b)		Discuss the properties and classification of ceramics.	*CO3*	*PO1*	**10**
			OR			
6	a)		Compare and contrast annealing & normalizing processes.	*CO4*	*PO1*	**05**

		b)	Highlight the composition, properties, microstructure and examples of low, medium and high carbon steels.	*CO3*	*PO1*	**10**
		c)	Point out the various applications of polymers.	*CO3*	*PO1*	**05**
			UNIT - V			
	7	a)	Define Composite materials. Classify them.	*CO3*	*PO1*	**10**
		b)	Explain the working of a squeeze casting process with a neat sketch. State its advantages and disadvantages.	*CO3*	*PO1*	**10**

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