CBCS SCHEME

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BME303

Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Material Science and Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Differentiate between crystalline and non-crystalline solids.	06	L4	CO1
	b.	Explain briefly atomic bonding, ionic bonding and metallic bonding.	08	L2	CO1
	c.	Define (APF) Atomic Packing Factor. Calculate APF for BCC cell.	06	L4,L1	CO1
		OR			
Q.2	a.	Explain slip and twinning.	06	L2	CO1
	b.	Explain point defects and Edge dislocation with necessary diagram.	08	L2	CO1
	c.	With necessary diagram, explain Bragg's law.	06	L3	CO1
		Module – 2			
Q.3	a.	State and explain Hume-Rothery Rule governing the formation of substitutional solid interstitial solid solution with examples.	08	L2	CO2
	b.	Explain with neat sketch, substitutional and interstitial solid solutions with examples.	06	L2	CO2
	c.	State and explain Fick's laws of Diffusion.	06	L3	CO2
		OR			
Q.4	a.	Explain Lever Rule and Gibbs phase rule with an example.	08	L3	CO2
	b.	Draw Fe-Fe_3C diagram. Label all phases, temperatures. Explain solidification process for 0.8% C.	12	L2	CO2
		Module – 3			
Q.5	a.	Draw TTT diagram for 0.8% C and superimpose the cooling curves. Explain briefly.	10	L2	CO3
	b.	With neat sketch, explain hardening and tempering heat treatment processes.	10	L3	CO3
		OR			
Q.6	a.	Explain Age hardening of Al – Cu alloys.	06	L2	CO3
	b.	With neat sketches, explain flame hardening.	06	L3	CO3
	c.	Draw the TTT diagram of austenite for eutectoid steel. Explain the various transformations product of austenite.	08	L2	CO3
		Module – 4			
Q.7	a.	Explain briefly common types of coatings.	10	L2	CO4
	b.	With a neat sketch, explain Physical Vapour Deposition (PVD) and Chemical Vapour Deposition (CVD) process.	10	L3	CO4
		OR			
Q.8	a.	Explain briefly about particle shape and particle size.	10	L2	CO4
	b.	Explain any two methods of powder production technique.	10	L2	CO4
		Module – 5			
Q.9	a.	Define composite. Give its classification.	06	L1,L2	CO5
	b.	Explain Metal Matrix Composite and Ceramic Matrix Composites.	08	L2	CO5
	c.	List the advantages and disadvantages of composite materials.	06	L4	CO5
		OR			
Q.10	a.	Explain the evolution of Engineering materials with the help of block diagram.	10	L2	CO5
	b.	With the necessary flowchart, explain the design flow process chart.	10	L3	CO5

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