

Model Question Paper-2 with effect from 2019-20 (CBCS Scheme)

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Fourth Semester B.E. Degree Examination Material Science and Metallurgy

TIME: 03 Hours

Max. Marks: 100

Note: Answer any **FIVE** full questions, choosing at least **ONE** full question from each **MODULE**.

		Module -1	*Bloom's Taxonomy Level	Marks
Q.01	a	Define atomic packing factor and calculate atomic packing factor for HCP crystal structure.	L1, L5	7
	b	Differentiate between edge dislocation and screw dislocation.	L4	5
	c	Classify in detail the different types of crystal Imperfections.	L4	8
OR				
Q.02	a	State and briefly explain the factors affecting diffusivity.	L2	6
	b	Discuss diffusion process and laws of diffusion.	L6	6
	c	Explain with a neat sketch the edge dislocation.	L5	8
Module-2				
Q. 03	a	Distinguish between slip and twinning.	L4	6
	b	Differentiate between ductile fracture and brittle fracture.	L4	6
	c	Explain the Creep curve indicating various stages of creep.	L5	8
OR				
Q.04	a	Derive an expression for the critical resolved shear stress for slip in a single crystal.	L6	8
	b	Explain plastic deformation by slip with a neat sketch.	L5	6
	c	Explain with stress strain diagram the behavior of ductile metal under static tension.	L5	6
Module-3				
Q. 05	a	State Gibb's phase rule and lever rule and explain each term.	L1, L5	6
	b	What are cooling curves? Explain the construction of T-T-T diagram with a labeled figure.	L1, L5	8
	c	What is a solid solution? Mention the types of solid solution.	L1, L3	6
OR				
Q. 06	a	Enumerate Home Rothary rules governing the formation of the solid solution.	L6	8
	b	Draw the iron-carbon equilibrium diagram, show all the phases on it and explain briefly.	L6	12
Module-4				
Q. 07	a	Explain: carburizing and age hardening.	L4	10
	b	Write a brief note on: annealing and normalizing heat treatment processes.	L4	10
OR				
Q. 08	a	Explain the different methods of surface hardening.	L4	10
	b	Explain the following: 1) Recrystallization temperature 2) Grain boundary	L4	10

Module-5				
Q. 09	a	Define ceramics. Explain briefly the types of ceramics.	L1, L4	10
	b	Explain the role of Matrix and the reinforcement in composite material. Explain the advantages and applications of composite material.	L4	10
OR				
Q. 10	a	With a neat sketch explain Pultrusion process and mention its applications.	L4	8
	b	Mention at least three different types of cast iron. How do they differ with respect to composition and structure?	L5	12