



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

	Insem Examination - I Winter 2023		
	Exam Seat No.:		
	Academic Year: 2023-2024	Semester: III	
	Name of Programme: B.Tech (Mechanical Engineering)	Pattern: 2022	
	Name of Course: Engineering Metallurgy	Course Code: MEC222003	
	Max. Marks: 30	Duration: 1 Hr.	

	<p>Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.</p> <ol style="list-style-type: none">1. This question paper contains 2 pages.2. Answer to each new question is to be started on a new page.3. Assume suitable data wherever required but justify it.4. Draw the neat, labelled diagrams, wherever necessary.5. The last columns indicates the Course Outcome.	
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Question No. 1 Attempt following Question

- a) Explain in brief crucible furnace used for metal extraction and enlist its types. (5) CO1

OR

- b) Define and represent graphically (i) Stiffness (ii) Toughness (5) CO1

- c) Define Miller Indices. Draw the following planes:
(020), (010), (0 $\bar{1}$ 0), (011) (5) CO1

OR

- d) Classify crystal imperfections. Explain interstitial impurity defect. (5) CO1

- e) Explain in brief yield strength and ultimate tensile strength with suitable curve. (5) CO1

OR

- f) Explain edge dislocation with a neat diagram. (5) CO1

Question No. 2 Attempt following Question

- a) Illustrate process of solidification of pure metal on a Time Temperature curve. What you mean by (i) Growth (ii) Nucleation (5) CO2

OR

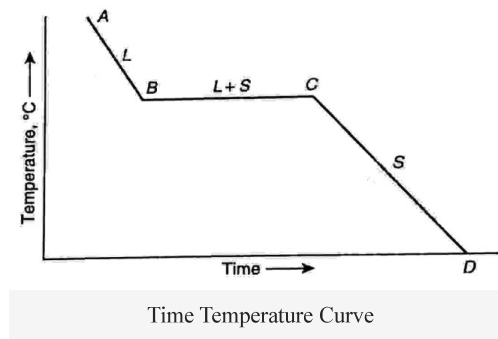
- b) Explain with suitable example why etching is essential for metallographic sample. (5) CO2

- c) State the working principle and applications of scanning electron microscopy. (5) CO2

OR

- d) Why it is necessary to detect the amount of Sulphur in a steel? Describe the steps to be followed during Sulphur printing for the detection of Sulphur. (5) CO2

- e) Apply Gibbs phase rule to determine degrees of freedom in region AB, BC and CD. Refer given time temperature curve.



(5) CO2

OR

- f) Discuss the implication of the rule that governs solubility limit of solute in the solvent. (5) CO2