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Code No.: ME302PC | R20 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–I–Semester End Examinations (Supply) -February- 2024
MATERIAL SCIENCE AND METALLURGY
(MECH)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1. a)	Distinguish between Screw and Edge dislocation.	[2M]
b)	Mention the applications of ceramics.	[2M]
c)	Write down the eutectoid and peritectic reactions.	[2M]
d)	What is solid solution?	[2M]
e)	Distinguish case hardening and carburizing.	[2M]
f)	Write a short note on normalizing process.	[2M]
g)	What do you mean by the term case-hardening?	[2M]
h)	In what ways, flame hardening differs from induction hardening?	[2M]
i)	List the most important properties of copper.	[2M]
j)	Mention various types of aluminium alloys.	[2M]

PART-B **(50 Marks)**

2.	Describe in detail about following dislocations. i. Edge Dislocation ii. Screw Dislocation	[10M]
	OR	
3.	What is critical resolved shear stress? Calculate the critical resolved shear stress for slip.	[10M]
4. a)	Explain various invariant reactions in iron-iron carbide diagram.	[5M]
b)	Discuss in detail about peritectic reaction.	[5M]
	OR	
5.	Sketch and explain the schematic representation of substitutional and interstitial solid solutions.	[10M]
6.	Draw the TTT diagram for Fe-C alloys and label the phases.	[10M]
	OR	
7.	Write about Annealing, normalizing, Hardening. Draw and explain the structures.	[10M]
8. a)	Explain the processes of Nitriding. When do you use it?	[5M]
b)	Describe briefly about different types of carburizing methods.	[5M]
	OR	
9.	What is hardening? Explain the method of flame hardening in brief.	[10M]
10.	Classify the cast iron and explain the microstructure, properties and applications of malleable cast iron.	[10M]
	OR	
11.	Describe various alloys of copper and their composition and applications.	[10M]

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