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

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–I–Semester End Examinations (Regular) - January- 2022
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 Frankel and Schottky defect.	[2M]
	b)	Compare and Contrast Precipitation hardening and Particulate hardening.	[2M]
	c)	Explain the set of rules for two materials to form an Alloy.	[2M]
	d)	Name the type of phase transformation reaction, when the Degrees of Freedom 'F' is zero. Give an example for such transformation.	[2M]
	e)	Explain the reasons for annealed alloy to exhibit more ductility than quenched alloy.	[2M]
	f)	Why alloys have to be heat treated?	[2M]
	g)	Compare the microstructure features of Bainite and Pearlite	[2M]
	h)	State the principle of Induction hardening.	[2M]
	i)	Estimate the fracture surface texture and color of Grey cast iron and White cast iron.	[2M]
	j)	List the features of Titanium Alloys.	[2M]

PART-B **(50 Marks)**

2.	Explain in detail about role of dislocations in all the strengthening mechanism.	[10M]
	OR	
3.	Determine the relationship between 'a & R', APF of BCC.	[10M]
4.	Analyze the microstructural development of Fe- 0.2 %C with help of Fe-C phase diagram.	[10M]
	OR	
5.	Draw Fe-C phase diagram. Compare mechanical and structural behavior different phases available in Fe-C phase diagram.	[10M]
6.	Compare and contrast all the bulk heat treatment processes.	[10M]
	OR	
7.	Explain in detail about the diffusion less heat treatment process. Describe the structural and mechanical features of the phase formed during the heat treatment process.	[10M]
8.	Briefly explain about various surface heat treatment processes.	[10M]
	OR	
9.	Draw CCT curve of eutectoid steel. Explain the microstructural evaluation.	[10M]
10.	Compare and contrast Grey, Malleable, Nodular and White Cast Iron in all views.	[10M]
	OR	
11.	Write a brief notes on designation of Aluminum Alloys.	[10M]

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