Final:- 27.10.2021

Course Code: 1930312 Roll No: **MLRS- R19**

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

II B.Tech I Sem Supply End Examination, October 2021

MATERIAL SCIENCE AND METALLURGY

(MECHANICAL)

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

Note: 1. Answer any FIVE questions.
2. Each question carries 14 marks and may have a, b as sub questions.

1	a)	Calculate the following crystal structure properties for simple cubic lattice: (i) number of atoms per unit cell, (ii) coordination number (CN), and (iii) APF	7M	CO1	BL3
	b)	What is crystallography? Define crystalline and Non-Crystalline materials with examples.	7M	CO1	BL1
2	a)	Explain about any one strengthening mechanism?	7M	CO1	BL4
	b)	Explain briefly about Volume defects?	7M	CO1	BL4
3	a)	Define solid solution, phase and component. Explain clearly the various types of solid solutions	7M	CO2	BL4
	b)	Draw Fe-C phase diagram. Label all the phases and temperatures properly. Describe the phase changes during solidification of Fe – 0.45% C alloy.	7M	CO2	BL2
4	a)	Explain the theory of 'tempering'. What are the effects of tempering on the mechanical properties of steel?	7M	CO3	BL4
	b)	Explain the use of heat treatment process? Explain briefly about spheroidising heat treatment	7M	CO3	BL4
5	a)	Identify the following phase transformation reactions and give an example for : $Solid_1 + Solid_2 \rightarrow Solid_3$ with a neat sketch.	7M	CO2	BL3
	b)	What do you understand by heat treatment? Mention the various stages of heat treatment procedure	7M	CO3	BL1
6	a)	Describe flame hardening and compare it with induction hardening	7M	CO4	BL2
	b)	Explain the pack carburization with the help of neat diagram?	7M	CO4	BL4
7	a)	Explain with neat sketch the plasma nitriding process?	7M	CO4	BL4
	b)	Name at least four important aluminium base alloys. Give composition and their applications	7M	CO5	BL1
8	a)	What is a stainless steel? Explain the properties of ferritic, austenitic and martensitic stainless steels?	7M	CO5	BL4
	b)	Classify Titanium alloys? Write their properties and applications?	7M	CO5	BL1

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