

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III (New) EXAMINATION – WINTER 2019

Subject Code: 2131904**Date: 30/11/2019****Subject Name: Material Science and Metallurgy****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) Explain in brief Materials Science & Metallurgy.	03
	(b) Explain in brief important of dislocations.	04
	(c) Determine atomic packing factor for BCC crystal structure with sketch.	07
Q.2	(a) Explain the Twin boundaries by suitable sketches.	03
	(b) Explain in brief "Total Energy of Nucleation".	04
	(c) Draw & Explain Iron-Iron Carbide Diagram with all regions.	07
OR		
Q.3	(c) Explain the Hume Rothery's Rules with different Factors.	07
	(a) State & Explain the Gibbs Phase Rule with suitable Example.	03
	(b) What is Solidification? Explain various defects of Solidification.	04
	(c) Explain in Detail Ultrasonic testing Method with sketch and advantages, disadvantages & applications.	07
OR		
Q.3	(a) Write short note on annealing process.	03
	(b) What are the factors that decide the types of cast irons?	04
	(c) Explain the process of specimen preparation with different steps.	07
Q.4	(a) Explain in Brief "Application of Diffusion".	03
	(b) Explain the Formation of Nuclei & Grain Structure.	04
	(c) List out the difference between Austempering Process & Martempering Process.	07
OR		
Q.4	(a) State critical reactions of Iron-carbon phase Diagram.	03
	(b) Write the basic steps for powder metallurgy method.	04
	(c) Write a Brief short notes on Bearing Steel, Spring steel & H. S. S.	07
Q.5	(a) State & Explain Lever Rule for phase diagram	03
	(b) Explain the construction of Metallurgical Microscope with sketch.	04
	(c) Write short notes on Nickel And Its Alloys.	07
OR		
Q.5	(a) Write short note on Gray Cast Iron.	03
	(b) Explain the Induction Hardening process with diagram.	04
	(c) Explain Radiography Testing method with neat sketch. Also explain limitations and applications	07
