

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– III (New) EXAMINATION – WINTER 2019****Subject Code: 3131904****Date: 28/11/2019****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) What is unit cell.	03
	(b) Explain any two mechanical properties.	04
	(c) Do the detailed classification of engineering material.	07
Q.2	(a) Grain boundary is a defect. Evaluate.	03
	(b) Explain the importance of undercooling in nucleation.	04
	(c) Explain the final solidification structure of a pure metal ingot.	07
	OR	
	(c) Explain homogeneous and heterogeneous nucleation process with neat sketch.	07
Q.3	(a) Describe applications of phase diagram.	03
	(b) Eutectic alloys solidify at fixed temperature. Justify with the help of Gibbs Phase rule.	04
	(c) What is the purpose of hardening? Explain induction hardening in detail.	07
	OR	
Q.3	(a) Explain interstitial solid solution.	03
	(b) Explain Hume Rothary rule for substitutional solid solution	04
	(c) Explain the detail procedure of polishing the specimen for microexamination.	07
Q.4	(a) What is the role of etchant in microexamination?	03
	(b) Explain the principle of magnetic particle test with neat sketch.	04
	(c) Draw and label Iron – Iron Carbide diagram. Also explain the reactions taking place in it.	07
	OR	
Q.4	(a) Differentiate between Eutectic and Eutectoid reaction.	03
	(b) What are the limitations and capabilities of LPT.	04
	(c) Explain the advantages and disadvantages of powder metallurgy.	07
Q.5	(a) What is martensite?	03
	(b) Differentiate between annealing and normalizing	04
	(c) Explain Jominy Hardenability test with neat sketch.	07
	OR	
Q.5	(a) Why cast iron has a limited engineering applications?	03
	(b) Explain macro and micro examination.	04
	(c) Explain the mechanism of corrosion. Also explain any one corrosion prevention technique in detail.	07
