

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV (NEW) EXAMINATION – WINTER 2021****Subject Code:3142109****Date:05/01/2022****Subject Name:Physical Metallurgy****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS	
Q.1	(a) Give factors on which all multi-phase materials depends upon.	03	
	(b) Explain phase, components and degree of freedom.	04	
	(c) Explain phases in alloys.	07	
Q.2	(a) Explain polymorphism of Iron.	03	
	(b) Explain properties variation of Isomorphous system.	04	
	(c) What is nucleation? Explain self-nucleation.	07	
OR			
Q.3	(c) Explain Hume-Rothery's rule for substitutional solubility.	07	
	(a) Find relative amount of Austenite and Cementite in eutectic alloy at eutectic temperature.	03	
	(b) Differentiate grain and crystal.	04	
Q.3	(c) Differentiate the cooling curve of pure metal and eutectic alloys.	07	
	OR		
	(a) Differentiate Gama Iron and Austenite.	03	
Q.4	(b) Sketch Fe-Fe ₃ C Diagram.	04	
	(c) Find the relative amount of alpha ferrite and cementite in eutectoid composition at room temperature and draw the micro structure of eutectoid alloy at room temperature.	07	
	(a) Explain hardenability.	03	
Q.4	(b) What is heat treatment and give its purpose.	04	
	(c) Compare Annealing and Normalizing.	07	
	OR		
Q.4	(a) Define cast iron.	03	
	(b) Effect of alloying elements on TTT diagram	04	
	(c) Explain TTT diagram of eutectoid steel.	07	
Q.5	(a) Classified Stainless steel.	03	
	(b) Explain- Metals are classified as ferrous and nonferrous.	04	
	(c) Application of Aluminum and its alloys and Titanium and its alloys.	07	
OR			
Q.5	(a) Explain shape memory alloys.	03	
	(b) Explain precipitate hardening.	04	
	(c) Explain heat treatment of Ni based super alloys.	07	
