Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – SUMMER • 2014

Subject Code: 162101 **Date: 19-05-2014**

Subject Name: Physical Metallurgy-I

Time: 10:30 am - 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.**

Q.1	**(a)**	Define Crystal and Crystal System? List different crystal systems. Explain FCC and BCC with sketches.	**07**
	(b)	Write important features of Miller Indices. Draw Different planes and directions for following systems: (1 1 2),(0 1 1), (0 0 1), [1 0 0],[0 0 1]	**07**
Q.2	**(a)**	What is solid solution? Discuss briefly substitutional and interstitial solid solutions.	**07**
	(b)	What is phase diagram? How are they classified? Draw completely labeled Cu-Ni equilibrium diagram.	**07**
		OR	
	(b)	Draw completely labeled Iron- Iron carbide equilibrium diagram. Explain various phases and transformation reactions in it.	**07**
Q.3	**(a)**	Define steel. Write classification of steel. Explain effects of impurity elements on properties of steel.	**07**
	(b)	Write advantages and limitations of Plain Carbon steels. Write applications of plain carbon steels.	**07**
		OR	
Q.3	**(a)**	Discuss effects of alloying elements on the properties of plain carbon steel.	**07**
	(b)	Explain coding systems used for designation of steel as per Indian Standard (IS) and American standard.	**07**
Q.4	**(a)**	Write classification of cast irons. Discuss in detail about Ductile Cast iron.	**07**
	(b)	Draw labeled microstructure of gray cast iron. Explain effects of graphite flakes on the properties of gray cast iron.	**07**
		OR	
Q.4	**(a)**	Compare white and gray cast irons.	**07**
	(b)	Write short note on malleable cast iron.	**07**
Q.5	**(a)**	What is metallography? Write in detail about basic steps required to prepare metallographic specimen	**07**
	(b)	Differentiate between Macroscopic and Microscopic Examinations. Explain briefly Electrolytic polishing.	**07**
		OR	
Q.5	**(a)**	Write a short note on Metallurgical microscope.	**07**
	(b)	What is Non metallic inclusion? Write sources and formation of Non Metallic inclusions.	**07**

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