Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI EXAMINATION – WINTER 2015

Subject Code:162101 **Date:15/12/ 2015**

Subject Name: Physical Metallurgy-I

Time:2:30pm to 5:00pm **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)**	What is crystal structure? Explain BCC, FCC and HCP structures.	**07**
	(b)	Explain briefly alloy with examples. Explain the terms: System, Component, Phase, Degree of freedom.	**07**
Q.2	**(a)**	Draw completely labeled Fe-Fe_3C equilibrium diagram and mention all transformation reactions.	**07**
	(b)	Define austenitic grain size? Explain the method of grain size measurement.	**07**
		OR	
	(b)	Short note on Allotropy of iron.	**07**
Q.3	**(a)**	Discuss Gibb's phase rule with example.	**07**
	(b)	Explain briefly Nucleation and Growth mechanism during solidification. What is Supercooling?	**07**
		OR	
Q.3	**(a)**	Draw and explain cooling curves for pure metal, binary solid solution alloy and binary eutectic alloy.	**07**
	(b)	Draw and briefly explain the Copper-Ni binary phase diagram.	**07**
Q.4	**(a)**	What is Solid Solution? Discuss Hume-Rothery rules.	**07**
	(b)	Give classification of steel. Mention the effect of Ni, Cr and Mn on the properties of steel.	**07**
		OR	
Q.4	**(a)**	Discuss briefly about Nodular cast iron .	**07**
	(b)	Write a short note on: Coding of Steel as per Indian Standards (IS).	**07**
Q.5	**(a)**	Short note on Plain carbon steel.	**07**
	(b)	Draw and labeled microstructures of Hypoeutectoid, Eutectoid and Hypereutectoid plain carbon steels.	**07**
		OR	
Q.5	**(a)**	Explain Gray cast iron with neat microstructure.	**07**
	(b)	What is Metallography? Draw a labeled sketch of metallurgical microscope.	**07**

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