Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER – VII • EXAMINATION – WINTER 2012

Subject code: 172101 Date: 26/12/2012

Subject Name: Physical Metallurgy - II

Time: 10.30 am - 01.00 pm Total Marks: 70

Instructions:

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

Q.1	**(a)**	Draw Time - Temperature -Transformation (T T T) diagram for hypereutectoid steel and describe the effect of alloying elements on T T T diagram.	**07**
	(b)	Explain Hull-Mehl model of pearlitic transformation,	**07**
Q.2	**(a)**	Describe the characteristics and mechanism of Bainitic transformation.	**07**
	(b)	What is austenitic grain size? Write the method of austenitic grain size determination and give its importance.	**07**
		OR	
	(b)	What do you mean by Forming of austenite? Discuss the kinetics of austenite formation.	**07**
Q.3	**(a)**	Critically compare the Athermal and isothermal martensites.	**07**
	(b)	Give the significance of hardenability and explain the Jominy End Quench method for hardenability measurement.	**07**
		OR	
Q.3	**(a)**	What do you understand by Diffusionless martensitic transformation? Explain the effect of applied stress on martensitic transformation.	**07**
	(b)	What is quenching? Discuss different Characteristics of quenchants and explain mechanism of quenching.	**07**
Q.4	**(a)**	Define Annealing. List different types of annealing processes. Differentiate between full annealing and partial annealing.	**07**
	(b)	What is carburizing? Briefly discuss solid (pack) carburizing.	**07**
		OR	
Q.4	**(a)**	What is tempering? Give the need of tempering process. What are the structural changes taking place during tempering treatment?	**07**
Q.4	**(b)**	What is nitriding? Describe the plasma nitriding technique.	**07**
Q.5	**(a)**	Briefly discuss Austempering and Martempering processes.	**07**
	(b)	Discuss heat treatment cycle for tool steel.	**07**
		OR	
Q.5	**(a)**	Define the following defects in heat-treated parts and explain their causes and possible remedies: 1. Decarburization 2. Overheating 3. Burning.	**07**
	(b)	Discuss various Heat treatment processes of copper alloys.	**07**

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