Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject code: 131904 **Date: 10-01-2013**

Subject Name: Material Science & Metallurgy

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)**	State utmost required engineering properties for following applications: 1. Bolt 2. Gear 3. Helical Spring 4. Shaft 5. Cutting Tool 6. Cylinder of I.C. Engine 7. Gas Turbine Blade	**07**
	(b)	State chief Advantages, Limitations and Applications of Powder Metallurgy.	**07**
Q.2	**(a)**	With neat sketches, explain Solidification of Metal.	**07**
	(b)	Briefly explain Steel region of Iron Carbon Diagram. State critical reactions in the region.	**07**
		OR	
	(b)	What is metallorgrapy? What useful information can be obtained from it?	**07**
Q.3	**(a)**	State composition, specific properties and applications of White Cast Iron.	**07**
	(b)	Define the term "Non Ferrous". State composition, specific properties and applications of 1. Muntz Metal 2. Duralumin	**07**
		OR	
Q.3	**(a)**	State the Qualities Required in Bearing Metals. State composition, specific properties and applications of Babbit Metal.	**07**
	(b)	State composition, specific properties and applications of high carbon steel.	**07**
Q.4	**(a)**	Define Heat Treatment. Explain the importance of TTT diagram in heat treatment.	**07**
	(b)	State Case Hardening processes and explain any one in detail.	**07**
		OR	
Q.4	**(a)**	For hardening of steels, which quenchant would you prefer, water or oil? Explain reasons.	**07**
	(b)	State Surface Hardening processes and explain any one.	**07**
Q.5	**(a)**	How would you assess the quality of welded joints using NDT methods?	**07**
	(b)	Define "corrosion". Explain different types of corrosion.	**07**
		OR	
Q.5	**(a)**	How would you determine internal flaws in a cast engineering component made of ferrous alloy without damaging the part?	**07**
	(b)	State various methods of prevention of corrosion and briefly explain any two.	**07**

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