Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 710808N **Date: 05-12-2014**

Subject Name: Material Science and Material

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 crystalline structure with its type. Write the differences between crystalline and non crystalline structure.	**07**
	(b)	Classify Atomic bonding in structure & discuss in detail the bonding in context of bonding forces and energies.	**07**
Q.2	**(a)**	What are the types of Fractures in Metals? Discuss in detail the Brittle fracture.	**07**
	(b)	Explain Hypothetical energy curve without expansion and actual energy curve with expansion.	**07**
		OR	
	(b)	Explain cathodic protection of corrosion.	**07**
Q.3	**(a)**	What do you mean by Super alloy? Discuss about the engineering applications of Super alloy.	**07**
	(b)	Explain effects of service condition on the performance of materials.	**07**
		OR	
Q.3	**(a)**	Explain in detail the effects of temperature on mechanical properties.	**07**
	(b)	What are advance magnetic materials? Explain soft and hard magnets.	**07**
Q.4	**(a)**	Enlist some Smart materials with its characteristics. Briefly explain specific applications of smart materials in engineering.	**07**
	(b)	Explain Residual stress measurement techniques.	**07**
		OR	
Q.4	**(a)**	Explain application and damage of laser.	**07**
Q.4	**(b)**	Discuss trends in development of Bio materials and its characterization.	**07**
		OR	
Q.5	**(a)**	Write a short note on delayed fracture and explain in details about cyclic fatigue of metal	**07**
	(b)	Explain any one metal matrix composite manufacturing process.	**07**
		OR	
Q.5	**(a)**	Explain Radiation damage in materials and its recovery methods.	**07**
	(b)	What is the significance of non-destructive testing? Explain Ultrasonic flow detection techniques.	**07**

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