Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject code: 710808N **Date: 24-06-2014**

Subject Name: Material Science and Material

Time: 02:30 pm - 05:00 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)**	Describe the factors affecting selection of materials for engineering application.	**07**
	(b)	(i) Explain the meaning of Anisotropy of material properties.	**04**
		(ii) Describe Grain boundary deformation	**03**
Q.2	**(a)**	Derive and discuss the Debyeôs theory with appropriate application.	**07**
	(b)	Differentiate Destructive and Non destructive testing. State its application in manufacturing industries.	**07**
		OR	
	(b)	Write brief note on ñSmart materialsò.	**07**
Q.3	**(a)**	Explain effects of service condition on the performance of materials for boiler application.	**07**
	(b)	Explain the fracture behavior of engineering materials.	**07**
		OR	
Q.3	**(a)**	Discuss in detail the electronic configuration.	**07**
	(b)	List the advance magnetic materials. Explain properties and engineering application of these materials.	**07**
Q.4	**(a)**	Define the meaning of ñthermal conductivityò and derive the equation for the Wrideman-Franz ratio.	**07**
	(b)	Explain the meaning of super alloys. Explain properties and engineering application of super alloys.	**07**
		OR	
Q.4	**(a)**	Explain principle and process of X-ray and γ (gamma) ray radiography technique.	**07**
	(b)	Describe trends in development of Bio materials and its characterization.	**07**
Q.5	**(a)**	What do you mean by delayed fracture and explain in details about cyclic fatigue of metal	**07**
	(b)	Describe the term stress corrosion cracking (SCC). state causes and remedies of SCC	**07**
		OR	
Q.5	**(a)**	Explain distortion and residual stress measurement techniques.	**07**
	(b)	Define the term composite material. and explain properties and application of polymeric material composite.	**07**

****