Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-I Remedial Examination January/ February 2011

Subject code: 710808
Subject Name: Material Science and Materials

Date: 03 /02 /2011 **Time: 02.30 pm – 05.00 pm**

Total Marks: 60

Instructions:

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

Q.1	**(a)**	Give a clear idea about Quantum numbers.	**06**
	(b)	Discuss the need of studying Material science.	**06**
Q.2	**(a)**	Give an electronic configuration for the following elements by stating their atomic numbers: (i) Silicon (ii) Carbon (iii) Aluminum	**06**
	(b)	Discuss the deformation of metals at elevated temperature.	**06**
		OR	
	(b)	Discuss in detail the concept of atomic bonding in solids in context of bonding forces and energies.	**06**
Q.3	**(a)**	What are the types of Fractures in Metals? Discuss in detail the Brittle fracture.	**06**
	(b)	Derive and discuss the Debye's theory.	**06**
		OR	
Q.3	**(a)**	Discuss in detail the Yielding in single crystalline materials.	**06**
	(b)	Write a short note on Advanced polymeric materials.	**06**
Q.4	**(a)**	Write a short note on variables affecting fatigue life of metals.	**06**
	(b)	Write a short note on Ferroelectric materials.	**06**
		OR	
Q.4	**(a)**	Write a note on S-N curve.	**06**
	(b)	Define the term "thermal conductivity" and derive the equation for the Wrideman-Franz ratio.	**06**
Q.5	**(a)**	Discuss in detail the stress corrosion and static fatigue.	**06**
	(b)	Explain any one Ceramic processing process.	**06**
		OR	
Q.5	**(a)**	Write a note on radiation damage and recovery.	**06**
	(b)	Write a short note on Delayed fracture.	**06**

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