Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject code: 142103 **Date: 29/12/2012**

Subject Name: Mechanical behavior and Testing of Materials

Time: 02.30 pm - 05.00 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 Stress-strain diagram for brittle and ductile material and label it properly. Define the following: 1. Ductility 2. Toughness 3. Young's Modulus 4. % Elongation	**07**
	(b)	Explain Rockwell Hardness Test method and list its advantages & limitations.	**07**
Q.2	**(a)**	Explain the procedure of tensile testing in brief.	**07**
	(b)	What is dislocation? Write note on sources of dislocations.	**07**
		OR	
	(b)	What do you mean by Burger's vector? Explain its role in identifying dislocations in a material.	**07**
Q.3	**(a)**	Explain in detail the Mechanisms of plastic deformation in polycrystalline materials.	**07**
	(b)	Classify material testing methods. Describe the criteria for selection of testing method.	**07**
		OR	
Q.3	**(a)**	Write a note on Recovery, recrystallization and grain growth.	**07**
	(b)	'Testing of material is an important task for industry' - justify comment.	**07**
Q.4	**(a)**	Write a short note on effect of temperature and strain rate on flow properties	**07**
	(b)	Explain Charpy Impact test and derive Relationship for energy absorbed by specimen.	**07**
		OR	
Q.4	**(a)**	Write a note on Micro Hardness Test. Give the applications.	**07**
	(b)	Define Brittle fracture. Describe mechanism of Brittle fracture propagation.	**07**
Q.5	**(a)**	What do you mean by S-N curve? Differentiate between ferrous alloys and non ferrous alloys with reference to their respective S-N curves.	**07**
	(b)	Define Creep. Write a note on Mechanism of creep deformation in metals.	**07**
		OR	
Q.5	**(a)**	What is meant by fatigue failure? Write a note on fatigue Mechanisms in metals.	**07**
	(b)	Draw a typical creep curve and explain the various stages in creep.	**07**

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