## **GUJARAT TECHNOLOGICAL UNIVERSITY** BE - SEMESTER-IV • EXAMINATION – SUMMER 2013

Subject Code: 142103Date: 14-06-2013Subject Name: Mechanical Behavior and Testing of Materials			,	
Tim	e: 10:.	30am – 01:00pm Total Marks: 70	)	
	1. A 2. N 3. F	ttempt all questions. I ake suitable assumptions wherever necessary. igures to the right indicate full marks.		
Q.1	(a) (b)	Discuss about techniques for observation of dislocations. Discuss about Recovery, Recrystallization & Grain Growth.	07 07	
Q.2	(a) (b)	Draw labeled S-N curve & explain fatigue. What is endurance limit? Define Dislocation. Describe about geometric properties of Dislocation. Difference between edge & screw dislocations	07 07	
	(b)	What are the strengthening mechanisms in solids? With schematic explain any two methods.	07	
Q.3	<b>(a)</b>	List types of hardness tests? Write application of each of this test for different metals and allovs. Which tests give more accuracy and why?	07	
	(b)	With sketch explain Ductile-Brittle Transition Temperature. How it is important in design based on service condition.	07	
Q.3	(a)	OR Derive formula for critical resolved shear stress? Determine the tensile stress that is applied along the [001] axis of silver to cause slip on	07	
	<b>(b</b> )	What is Creep? Draw labeled Creep Curve. Explain three stages of Creep.	07	
Q.4	(a) (b)	What are sources of dislocations? Write in details. Discuss – Super plasticity.	07 07	
0.4		OR NUL INC.	0.7	
Q.4	(a)	Normally which curve is referred to? Why?	07	
	<b>(b</b> )	Explain critically about tensile testing with necessary diagrams.	07	
Q.5	(a)	Which tests is used to measure toughness? Explain any one method.	07	

- (b) Do as directed (Any7) :-
  - i) Critical resolved shear stress is calculated by applying \_\_\_\_\_ law. (Fill in the blank)
  - ii) Is it true that strength increases then hardness increases? Justify it?
  - iii) Slip plane in copper is
    - a) (100) (b) (110) (c) (111) (d) (0001)
  - iv) Define resilience of material?
  - v) Beach marks on fractured surface are associated with \_\_\_\_\_ type of failure. (Fill in the blank)
  - vi) Angle between opposite faces of diagonal pyramid in Vickers hardness tests is \_\_\_\_.(Fill in the blank)
  - vii) APF (Atomic packing factor) for FCC & HCP is \_\_\_\_. (Fill in the blank)
  - viii) Poisson ratio of metals is \_\_\_\_\_ than unity. (Fill in the blank)
  - ix) Coordination number in SCC is
    - a) 4, b) 6, c) 8, d) 12
  - x) To determine transition temperature \_\_\_\_ test is done. (Fill in the blank)

## OR

- Q.5 Short notes on (Attempt any four):
  - i) Micro hardness testing.
  - ii) Importance of Material Testing.
  - iii) Difference between slip & twinning.
  - iv) Importance of calibration of testing equipments.
  - v) Slip systems in FCC, BCC & HCP.
  - vi) Only write formula for Brinell, Vickers, Meyers & knoop with symbol description.

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