

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-IV Examination-Nov/Dec-2011

Subject code: 142103

Date: 30/11/2011

Subject Name: Mechanical Behavior & Testing of Materials

Time: 02.30 pm -5.00 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) Explain the terms BCC, FCC, HCP. with neat diagram indicate closed pack structures of FCC, BCC, HCP. 07
- (b) What are the characteristics & Sources of Dislocations 07
- Q.2 (a) Draw S-N curve & explain how the surface roughness & chemical environment affect the curve. 07
- (b) Differentiate between Engineering stress-strain curve & True stress- strain curve 07
- OR
- (b) Explain how does grain boundary strengthening occur in A polycrystalline material 07
- Q.3 (a) Discuss the mechanism of solid solution strengthening? 07
- (b) Write Short Notes on followings. Any two 07
1. Techniques for observation of dislocation.
 2. Superplasticity.
 3. Importance of Material Testing.
- OR
- Q.3 (a) Define Creep, Draw the creep curve & explain the various stages of creep deformation. 07
- (b) Using the formula $2F$ 07
- $$BHN = \frac{2F}{\pi D \left\{ D - \sqrt{(D^2 - d^2)} \right\}}$$
- Calculate BHN for $d = 3.00 \text{ mm}$, $d = 3.65 \text{ mm}$, & $d = 4.15 \text{ mm}$,
- Q.4 (a) Explain the relationship between strain rate & Temperature with respect to shear stress 07

- (b) Describe Advantages and limitations of following hardness tests. 1. 07
Vickers Hardness Testing
2 Micro hardness testing
3. Rockwell Hardness Testing

OR

- Q.4 (a) What are the different types of impact test? What are the factors that affects the Impact strength ? 07
(b) Describe the Tensile testing Procedure. What do you mean by Gauge length & Percentage elongation ? 07

- Q.5 (a) What is Ductile-brittle transitions behavior and its significance. ? draw suitable diagram 07

- (b) Explain with diagram the Mechanisms of fatigue failure in metals. 07

OR

- Q.5 (a) What are the three basic properties of Materials.? What are the different testing methods ? 07

- (b) Define the following Terms. With suitable Diagram (Any three) 07
1. Dislocation climb
2. Dislocation Glide
3. Critical shear stress
4. Pinning
5. Slip plane
