

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. Sem. – IV - Examination –June- 2011****Subject code: 142103****Subject Name: Mechanical Behaviour and Testing of Materials****Date: 10/06/2011****Time: 10.30 am – 01.00 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) What is dislocation? Differentiate between Edge and Screw dislocation. **07**
(b) Explain briefly elastic and plastic deformation with examples of each. **07**

- Q.2** (a) Explain with sketch Frank-Read sources of dislocations. **07**
(b) Differentiate between plastic deformation by slip and twinning. **07**

OR

- (b) Discuss about slip planes and slip directions (slip systems) in FCC, BCC and HCP metals. Why steel is heated for deformation? **07**

- Q.3** (a) Classify types of testing methods. State criteria for selection of testing method giving examples for selection of the method. **07**
(b) Why annealing is done after cold working? Explain recovery, recrystallization and grain growth. **07**

OR

- Q.3** (a) Draw engineering and true stress-strain curves. Why they are different? Normally which curve is referred to? Why? **07**
(b) Explain critically about tensile testing with necessary diagrams. **07**

- Q.4** (a) List types of hardness tests. Write application of each of this test for different metals and alloys. Which test gives more accuracy? Why? **07**
(b) With sketch explain ductile-brittle transition. How it is important in design based on service conditions? **07**

OR

- Q.4** (a) What is fatigue? Explain with S-N curve. Define endurance limit. **07**
(b) Derive formula for critical resolved shear stress? Explain its importance in plastic deformation. **07**

- Q.5** (a) List strengthening mechanisms in solids. Explain any two with schematic diagrams. **07**
(b) Discuss in detail about creep. Why bulb filaments are made of single crystal? **07**

OR

- Q.5** (a) Which test is used to measure toughness? Explain any one method. **07**
(b) Discuss –Superplasticity. **07**
