

**III B.Tech II Semester Supplementary Examinations,
November/December 2005
MECHANICAL METALLURGY
(Metallurgy & Material Technology)**

Time: 3 hours**Max Marks: 80**

**Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Discuss the nature of partial dislocations in a FCC crystal.
(b) Explain how the dislocations can pass through or cut through obstacles such as precipitates. How are these mechanisms different at higher temperatures?
[8+8]
2. (a) Explain the working principle of shore scleroscope test.
(b) Explain the basis for selection of loads in Briunell's hardness test method.
[8+8]
3. (a) Explain the various factors to be considered in the selection of materials.
(b) Draw the engineering stress - strain curve for the following material and explain the same for their variation
 - i. Mild steel
 - ii. Cast iron
 - iii. Concrete
 - iv. glasses
 - v. Rubber.[6+10]
4. Discuss the different types of notched bar impact test specimens with neat sketches and standard dimensions.
[16]
5. (a) A sample of glass has a crack of half length 2mm. The young's modulus of glass 70GN/m^2 is and specific surface energy is 1J/m^2 . Estimate the fracture strength and compare it with its young's Modulus.
(b) Explain Ductile-Brittle transition temperature in metals.
[9+7]
6. (a) What do you mean by fatigue of metals? What factors aid fatigue failure?
(b) Draw S-N curve for a mild steel, Al-alloy and a Nickle alloy. Discuss about their endurance limits.
[7+9]
7. Write about
 - (a) Various types of creep resistant materials.
 - (b) Importance of creep at high temperature.
[8+8]
8. (a) Explain the principle and inspection of liquid penetrant N.D.T?

(b) What are the limitations of this test compared to other tests? [8+8]
