

III B.Tech II Semester Supplementary Examinations, Apr/May 2006
MECHANICAL METALLURGY
(Metallurgy & Material Technology)

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

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What is dislocation? Explain various dislocation movements?
(b) Draw the figure of an edge dislocation and explain how burger's vector is found.
(c) Explain substitutional point Imperfectionals in crystals. [6+4+6]
2. (a) What are the limitation of Brinnell's hardness test? Why should we adopt Rockwell hardness test? What necessiates employment of A, B & C scales in Rockwell test.
(b) An engineer claims that metal 1 is harder then metal II when tested by Brinell test, But metal II is harder than metal 1 when tested by Rockwell test. Justify his claim and explain the reasons. [8+8]
3. (a) Discuss the shear stress-shear strain diagram for FCC single crystals.
(b) Explain why the strength of brittle materials is usually larger in compression than in tension. [8+8]
4. (a) Giving the dimensions of the standard specimens used, explain the operation of notched bar impact test.
(b) Giving reasons explain temper embrittlement phenomenon. [8+8]
5. Derive an expression to show that the critical stress required for fracture in brittle material with a small crack is very less compared to what we get on theoretical calculation. [16]
6. (a) What is fatigue fracture? How the fractograph looks like? Explain it.
(b) What factors affect the fatigue failure of metals? [8+8]
7. (a) Draw an ideal Creep curve and explain the various stages on it.
(b) With the sketch of a creep test set up explain how creep rupture tests are conducted. [8+8]
8. What the Nondestructive tests you advise for the following. Give reasons for selection of such a process.
 - (a) Aviation components.
 - (b) Weldments of steel used in pressure vessals.
 - (c) Forged axels.

(d) Cold rolled bars of Titanium.

(e) Surface cracks on tubes.

[3+4+3+3+3+]

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