

IV B.Tech I Semester Supplementary Examinations, April/May 2005
MECHANICAL WORKING OF METALS
(Metallurgy & Material Technology)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) How do you represent the state of stress in three dimensions? How are stress and strains related?
(b) What is meant by triaxial cylindrical and spherical state of stress? Give examples.
2. What are the various theories of failures by plastic deformation? Explain the failure of a steel cantilever beam of 100mm length and 3x5 mm cross section. Assume any other data for plastic failure.
3. Explain:
 - (a) Strain hardening
 - (b) Strain relief
 - (c) Recovery
 - (d) Recrystallisation and
 - (e) grain growth.

What are the advantages of coarse grain structure?

4. (a) What are the various forging operations? Describe an open-back press.
(b) Differentiate open-die forging and closed-die forging.
5. (a) Present the simplified analysis of rolling loads, what are the rolling variables?
(b) What are the various rolling processes? Compare hot rolling and cold rolling processes.
6. (a) Compare the analysis of forward and backward extrusion processes.
(b) What are the defects of extrusion? Explain Hydrostatic extrusion.
7. (a) Compare tube making by extrusion and tube drawing methods.
(b) What are the residual stresses that are developed in drawn wires, rods and tubes.
8. Write short notes on any TWO of the following:
 - (a) Strain rate effects
 - (b) Octohedral shear stress and shear strain
 - (c) HERF
