Code No: NR411803 **NR**

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

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Describe state of stress in three dimensions with a suitable figure. [8]
   (b) With the help of a sketch, describe strain at a point. [6]
   (c) Define toughness and resilience. [2]
2. (a) Explain maximum shear stress or Tresca criterion.
   (b) What is the difference between engineering and true stresses? Draw the flow curve for aluminium and explain recoverable elastic strain and unelastic behaviour.
3. (a) Explain effect of temperature in metal working. [6]
   (b) Discuss mechanics of metal working with the help of slab method. [7]
   (c) What are the three principal effects of strain rate in metal working? [3]
4. (a) What is the difference between forging hammer and forging press? Briefly discuss forging equipment with respect to types, merits and limitations of each. [8]
   (b) Give brief explanation for the following:
      i. forging in plane strain [4]
      ii. forging defects [4]
5. (a) Thinner-gage sheet is produced by cold-rolling. Why? [2]
   (b) What are the main variables in rolling? Briefly discuss each one of them. [6]
   (c) Discuss forces and geometrical relationships in rolling. [8]
6. (a) Discuss forward and backward extrusion processes with neat sketches. [10]
   (b) Give an account on production of seamless pipe and tubing by extrusion process. [6]
7. (a) Briefly discuss deformation and defects in extrusion. [8]
   (b) With neat sketches, discuss tube-drawing process. [8]
8. Write short notes on:
   (a) Recovery, recrystallisation and grain growth. [6]
   (b) Arrangement of rolls in rolling mills. [5]
   (c) Powder metallurgy forging. [5]

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