

**III B.Tech II Semester Supplementary Examinations,
November/December 2005
METAL FORMING
(Production Engineering)**

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

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

1. Explain the terms:
 - (a) “True Stress” and “True Strain”. How they differ from the concepts of Engg. Stress and Engg. Strain
 - (b) Discuss the relationships between
 - i. True stress and Engineering stress
 - ii. True strain and Engineering strain [8+8]
2. (a) Describe ‘dislocation’ theory. How a Burger’s Vector is generally used in dislocation. How is displacement expressed by it ?
(b) Derive an expression for ‘Critical Resolved shear stress’. [8+8]
3. (a) A steel washer of 28 mm outer diameter and 20 mm inside diameter is to be made from 1.3 mm thick sheet. If the shear stress of the material is 380N/mm^2 . Calculate:
 - i. Force required to produce washer if both punches operate at the same time with no shear. What will be stripping force?
 - ii. Force required if only one punch operates at a time (i.e. punches are staggered)?(b) Discuss the design principles of the following:
 - i. Punch length
 - ii. Punch plate
 - iii. Punch Holder. [8+8]
4. (a) What are the factors that influence selection of a press.
(b) Classify different presses for sheet working of metals. Discuss their principle and specific applications.
(c) What are the advantages of Mechanical press over Hydraulic Press. [4+7+5]
5. (a) Distinguish between extrusion, drawing and forging ? Compare their relative merits. How does extrusion pressure varies with Ram travel?
(b) A shell is to have its wall thickness reduced from 1.8 mm by 11%. The new shell will have a new diameter of 40 mm.
Determine:

- i. Mean Height of the shell
 - ii. Shell diameter needed to draw the ironed shell. [8+8]
- 6. (a) Sketch and describe the construction and working of hydrostatic extrusion and mention some of its applications and advantages.
- (b) Discuss the effects of deformation speeds, lubricants and different die materials in hot and cold working processes. [8+8]
- 7. (a) Define the concept of 'Forgeability'. Discuss various factors influencing it? How the 'Hot Twist' Test is performed to check forgeability.
- (b) Describe the construction and working of a Board Drop Hammer. List out some metals in the order of decreasing forgeability. [8+8]
- 8. (a) Why do we require different classification of rolling mills used in practice. Mention their relative advantages and applications.
- (b) How do you analyse the principles of roll pass design for different product shapes. [8+8]
