Code No: NR322002 **NR**

III B.Tech II Semester Supplementary Examinations, Apr/May 2006
METAL FORMING
(Production Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Discuss the concept of 'Super plasticity' and the requirements to be fulfilled to achieve superplasticity. Name few superplastic materials.
   (b) Obtain the neat sketch of an Engineering stress-strain diagram for Aluminium and indicate various salient points. [8+8]

2. (a) Discuss the concept of 'Strain Aging'. Explain its effect in flow curve of a low carbon steel with a sketch.
   (b) Define the following:
      i. Dislocation climb
      ii. Cross slip
      iii. Jogs in dislocation
      iv. Perfect and partial dislocation [8+8]

3. (a) What is the shear on punch (or) die ? How it is applied to punch and die for blanking and piercing operations ?
   (b) A piece of stock 2 mm thick is bent to an angle of 1200 with an inside radius of 6 mm. What is the original length of stock that goes into the bend. [8+8]

4. (a) How a toggle press differs from Cam press. Discuss their mechanism with sketches.
   (b) Sketch a double action press and indicate details in it. [8+8]

5. (a) A cup 5 cms in diameter and 7.5 cms deep is to be drawn from 1.5 mm thick drawing steel with a tensile strength of $315 N/mm^2$. The corner radius is negligible.
   Determine.
      i. Blank diameter
      ii. Least Number of drawing operations
      iii. Force and energy for the first draw with 40% reduction.
   (b) Derive the expression for maximum allowable reduction in Drawing. [8+8]

6. (a) Discuss optimum angles and effect of die materials in extrusion ? How does they affect productivity.
   (b) With the help of diagrams, compare Wire drawing and Tube drawing operations. [8+8]

7. (a) Discuss the following terms with illustrations?
   i. Forge welding
   ii. Drawing down
   iii. Upsetting
   iv. Fullering

   (b) Describe the process of machine forging. How it differs from press forging. [8+8]

8. (a) Differentiate between Two high Reversing Mill and Three High Mill. Sketch them.

   (b) Discuss the various stages of Shape Rolling of a component with sketches? What are its applications? [8+8]

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