(Please write your Exam Roll No.) Exam Roll No. .....

END-TERM EXAMINATION

FIFTH SEMESTER [B.TECH.]– DECEMBER-2007

Paper Code:ETME305 (Batch-2001-2003)(P) Subject: Press Working
Paper ID: 36305
Time : 3 Hours Maximum Marks : 75

Note: Attempt any five questions.

Q.1 (a) The true stress-strain curve of a metal is given as $\sigma = ae^n$ where a 850 MPa and n = 0.3. Determine the mean yield stress when a 100 mm long specimen of this metal is stretched to 157 mm. (7)

(b) Why polycrystalline materials exhibit strain-hardening when subjected to plastic deformation? (8)

Q.2 (a) Compare open and closed die forging. (5)

(b) What is plane strain deformation? How this can be achieved during compression between two flat dies? (5)

(c) Why is flash desirable in closed die forging? (5)

Q.3 (a) Why is 'springback'? Why this is an important consideration in cold-forming processes? (7)

(b) The thickness of a plate is to be reduced from 50mm to 25mm in a number of cold rolling passes. The roll radius is 350mm and the co-efficient of friction is estimated to be 0.15. For equal draft for each pass determine the number of passes required and the draft for each pass. (8)

Q.4 (a) Explain the following in connection with rolling. (6)

(i) Neutral point (ii) Angle of bite

(iii) Advantages of duster mill

(b) What is 'Extrusion'? What are different types of extrusion? Give their advantages and disadvantages. (9)

Q.5 (a) A 3 mm diameter wire is drawn to a diameter of 2.5mm. If the stress-strain curve of wire material is given by $\sigma = 500\ e^{0.3}$ MPa, determine the drawing stress required to achieve this reduction. (8)

(b) What is the primary benefit of tube drawing with floating plug? What happens when a cup is drawn from sheet metal? (7)

Q.6 (a) A flat bottom cup of inside diameter 70mm and height 50mm is to be deep drawn from a blank of 3 mm thickness. Determine the required diameter of the blank. Why are blanked edges generally not smooth? (8)

(b) A cylindrical workpiece of diameter 30mm and height 30mm is to be cold forged in a press to a height of 20mm. The press is capable of exerting a maximum force of 1 MN. If the true stress-true strain curve of the material is $\sigma = 400\ e^{0.2}$ and $\mu = 0$ find if this can be achieved on this press. (7)

Q.7 (a) How do you calculate the work load in bending? (6)

(b) An aluminum strip of 50mm width and 3 mm thickness is bent into a 90° angle. The data given is fracture strain = 0.25, $\mu = 0.1$ $\sigma_{y0} = 14$ N/mm^2, E = 70 KN/mm^2 die opening = 30 mm coefficient of linear strain hardening (n) = 30 N/mm^2. Determine (9)

(i) the minimum possible bending radius.

(ii) the angle of the bending punch, taking care of the spring back and

(iii) the peak bending force.

Q.8 Write notes on <u>any three</u>: - (5x3)

(a) Types of presses (b) Types of dies

(c) Plastic yield criteria (d) Die wear

(e) Defects in metal forming

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