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10ME55

Fifth Semester B.E. Degree Examination, June / July 2014
Manufacturing Process - III

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Compare Hot working and Cold working processes. **(08 Marks)**

b. A Copper wire has a nominal breaking strength of 300MPa. Its ductility is 77% reduction of area. Calculate the true stress for fracture. **(05 Marks)**

c. Derive the equation for principal stresses. **(07 Marks)**

2 a. Discuss the effect of : i) Friction ii) Lubrication on metal working process. **(08 Marks)**

b. Write a note on :
i) Deformation zone geometry ii) Workability of materials iii) Residual stresses in wrought products. **(12 Marks)**

3 a. Classify and explain the various forging process, with neat sketches. **(08 Marks)**

b. A circular bar of 150mm dia and 100mm height is forged at room temperature between two flat dies to 25mm height. Determine the yield strength, average die pressure, as well as maximum die pressures at the beginning of plastic deformation and at the end of compression. The yield strength of the material is given as $\sigma = 100.0\ (0.0085 + \varepsilon)^{0.39}$ N/mm^2 and $\mu = 0.1$. **(12 Marks)**

4 a. Explain the commonly used rolling mill arrangements in today's manufacturing industry. **(10 Marks)**

b. A roll mill has roll dia of 850mm. Calculate the maximum reduction possible in this mill if the coefficient of friction is 0.3. Determine the rolling load required to obtain 25% reduction of a metal strip of 35mm thickness using the same rolling mill, given the average yield strength of the metal as 180MPa and strip width as 690mm. **(10 Marks)**

PART – B

5 a. Discuss redundant work and its estimation in drawing. **(10 Marks)**

b. List and explain a few important process variables that affect the drawing force in wire drawing process. **(06 Marks)**

c. Explain tube drawing with a floating mandrel. **(04 Marks)**

6 a. Explain the sketches : i) Indirect extrusion ii) Hydro static extrusion. **(08 Marks)**

b. Write a note on extrusion dies. **(04 Marks)**

c. It is required to extrude an Aluminium alloy at 380^{0}C through square dies from 140mm to 50mm diameter. The ram speed is 40mm/sec and the flow stress of the material at 380^{0}C is 240MPa. Determine the extrusion force with the following data. Length of the billet is 450mm , Semi – die angle is 45^0 ; Coefficient of friction between work surface is 0.15. **(08 Marks)**

7 a. Explain the types of multi operation dies, with neat sketches. **(12 Marks)**

b. Calculate the maximum punch force and the work done required to blank a steel washer 44.45mm outside dia and 22.3mm inside dia from a 1.59mm thick rectangular sheet with an ultimate shear stress of 432N/mm^2 and the % penetration is 20%. **(08 Marks)**

8 a. Discuss any 3 methods of production of powders. **(06 Marks)**

b. List the advantages and disadvantages of HERF. **(08 Marks)**

c. Explain : i) Electromagnetic forming ii) Hot Isostatic Pressing. **(06 Marks)**

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