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Seventh Semester B.E. Degree Examination, December 2011
Manufacturing Processes - III

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1
 - a. State the advantages and limitations of metal working processes. (05 Marks)
 - b. What is flow stress? Name the methods to determine the flow stress. Explain any one method. (07 Marks)
 - c. Explain Tresca and Von-Mises yield criterion. (08 Marks)
- 2
 - a. Discuss the factors affecting recrystallization temperature in hot working. State the advantages of hot working over cold working. (08 Marks)
 - b. Define formability of materials. Discuss any one method to determine formability. (07 Marks)
 - c. What is hydrostatic pressure in metal working? Explain. (05 Marks)
- 3
 - a. Discuss the following in forging process :
 - i) Friction hill ii) Forging defects iii) Material flow lines (08 Marks)
 - b. An aluminum billet 25 mm ϕ , 50 mm high is compressed between flat parallel dies to a height of 25 mm. The average yield stress is 6 N/mm². Find the frictionless work done. Also determine the maximum pressure exerted if the coefficient of sliding friction is 0.24. (07 Marks)
 - c. Explain die design parameters in forging. (05 Marks)
- 4
 - a. Discuss the effect of front and back tension in rolling. (05 Marks)
 - b. Explain the following rolling mills :
 - i) Two high mill ii) Cluster mill iii) Tandem mill (08 Marks)
 - c. Calculate the rolling load if steel sheet is hot rolled 30% from a 40 mm thick slab using a 900 mm diameter roll. The slab is 760 mm wide. Assume $\mu = 0.30$. The plane-strain flow stress is 140 MPa at entrance and 200 MPa at the exit from the roll gap due to the increasing velocity. (07 Marks)

PART – B

- 5
 - a. What is drawing process? Explain. (05 Marks)
 - b. What is redundant work in drawing? How is it estimated? (07 Marks)
 - c. Determine the drawing stress to produce a 20% reduction in a 10 mm stainless steel wire. The flow stress is given by $\sigma_0 = 1300 \epsilon^{0.30}$ MPa. The die angle is 12° and $\mu = 0.09$. If the wire is moving through the die at 3 m/s, determine the power required to produce the deformation. (08 Marks)
- 6
 - a. What is impact extrusion? Discuss. (05 Marks)
 - b. How seamless pipes are produced in extrusion process? Explain. (07 Marks)
 - c. Discuss any four extrusion defects with their causes and remedies. (08 Marks)
- 7
 - a. Explain combination die and progressive die in sheet metal forming. (08 Marks)
 - b. Discuss the following processes in sheet metal forming :
 - i) Roll bending ii) Blanking iii) Embossing iv) Deep drawing. (08 Marks)
 - c. Write a note on die and punch material in sheet metal forming. (04 Marks)
- 8
 - a. Discuss the principle and applications of electro hydraulic forming. (08 Marks)
 - b. Discuss the basic steps in the powder metallurgy process. (07 Marks)
 - c. Explain the atomization method of powder production in powder metallurgy. (05 Marks)

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