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10ME55

Fifth Semester B.E. Degree Examination, June/July 2013

Manufacturing Process - III

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. How are metal forming processes classified? Explain with sketches. **(08 Marks)**

b. Explain Tresed and Von-Mises criteria. **(06 Marks)**

c. Discuss the plane stress and plane strain concepts. **(06 Marks)**

2 a. Explain the effects of following parameters in metal working processes:
i) Temperature ii) Strain rate iii) Friction and lubrication **(10 Marks)**

b. Comment on: i) Deformation zone geometry,
ii) Residual stresses in wrought products. **(10 Marks)**

3 a. Derive an expression for forging pressure and load acting in plane strain considering Coulomb's friction at the interface. **(08 Marks)**

b. List and explain die design parameters in forging. **(06 Marks)**

c. Briefly explain forging defects and residual stresses in forging. **(06 Marks)**

4 a. Sketch and explain different types of rolling mills. **(06 Marks)**

b. Discuss maximum possible reduction in rolling process. **(04 Marks)**

c. A steel sheet is hot rolled 30% from a 40 mm thick slab using 900 mm diameter roll. The slab is 760 mm wide. The plane flow stress is 140 MPa at entrance and 200 MPa at the exit from the roll gap due to the increasing velocity. Assume $\mu = 0.30$. Calculate:
i) Rolling load
ii) Rolling load with sticking friction. **(10 Marks)**

PART – B

5 a. Derive an expression for drawing load by slab analysis. **(08 Marks)**

b. Explain optimal cone angle and dead zone formation in drawing. **(06 Marks)**

c. Sketch and explain tube drawing process. **(06 Marks)**

6 a. Write a note on extrusion equipment, die design and lubrication. **(08 Marks)**

b. Sketch and explain extrusion of seamless tubes. **(08 Marks)**

c. Discuss extrusion variables. **(04 Marks)**

7 a. Explain with figures working of progressive and compound die arrangements in sheet metal working. **(10 Marks)**

b. With sketches, explain the operations: i) Rubber forming, ii) Deep drawing. **(10 Marks)**

8 a. With a neat figure, explain the following forming methods:
i) Explosive forming
ii) Electromagnetic forming **(10 Marks)**

b. Discuss with flow chart powder metallurgy process. **(10 Marks)**

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