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10MA755

Seventh Semester B.E. Degree Examination, Aug./Sept.2020

Metal Forming Technology

Time: 3 hrs.

Max. Marks:100

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

- 1 a. Write a note on theory of plasticity. (05 Marks)
b. Illustrate the idealized flow curves for the following :
i) Rigid ideal plastic material ii) Ideal plastic material with elastic region. (12 Marks)
c. A tensile specimen with a 12mm initial diameter and 50mm gauge length reaches maximum load at 100 kN and fractures at 80 kN. The minimum diameter at fracture is 10mm. Determine the following : i) Engineering stress at maximum load
ii) True fracture stress iii) True strain at fracture. (03 Marks)
- 2 a. Illustrate the typical forming operations (any 5) in a very simplified way. (15 Marks)
b. Mention the 5 methods of stress analysis in metal working processes. (05 Marks)
- 3 a. What is Forging? Illustrate the following forging operations :
Piercing , Fullering , Drawing , Swaging , Punching. (16 Marks)
b. Illustrate a typical curve of forging load Vs stroke for closed – die forging process. (04 Marks)
- 4 a. Illustrate the arrangement of rolls in a cluster mill. (08 Marks)
b. Discuss the distribution of roll pressure along the arc of contact between roll and workpiece. (06 Marks)
c. List the main parameters (any 4) in rolling processes. (04 Marks)
d. Determine the maximum possible reduction for cold – rolling a 300 mm thick slab when $\mu = 0.06$ and the roll diameter is 600mm. What is the maximum reduction on the same mill for hot rolling when $\mu = 0.6$? (02 Marks)

PART - B

- 5 a. Discuss the working of direct extrusion process. (06 Marks)
b. Illustrate the 2 general types of extrusion dies. (06 Marks)
c. Explain the production of tubing by extrusion process. (08 Marks)
- 6 a. With a neat schematic diagram, explain the construction and working of a wire drawing equipments. (10 Marks)
b. Illustrate the following methods of tube drawing :
i) Floating plug method ii) Moving mandrel method. (10 Marks)
- 7 a. How are the sheet – metal parts classified? (05 Marks)
b. Illustrate the rubber forming process. (10 Marks)
c. Illustrate the deformation and stresses developed in a pie – shaped segment of the circular blank during deep drawing. (05 Marks)
- 8 a. Discuss 'Explosive forming' process. (10 Marks)
b. Illustrate 'Electromagnetic forming' process. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.