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10ME55

Fifth Semester B.E. Degree Examination, Dec.2014/Jan.2015

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. Briefly explain the classification of forming process based on force applied. (10 Marks)
- b. Explain the following yield criterion:
 - i) Tresca's
 - ii) Von-Mises (05 Marks)
- c. Derive the flow stress equation. (05 Marks)
- 2 a. Discuss the effect of various parameters on metal working process. (10 Marks)
- b. Difference between cold working and hot working process. (05 Marks)
- c. Write a note on workability of materials. (05 Marks)
- 3 a. What are the assumptions made while analyzing forces during forging? Derive the expressions for forging pressures and load in open die forging by slab analysis (sliding occurs at interface). Hence find mean forging pressure.
 - i) With coulomb friction at the interface.
 - ii) With constant friction factor at the interface. (12 Marks)
- b. With neat sketch, explain the working of "Board-drop hammer". (04 Marks)
- c. Explain the parameters to be considered during die design in forging. (04 Marks)
- 4 a. With neat sketch, explain different types of rolling mill arrangements. (10 Marks)
- b. Explain the defects of rolled product. (05 Marks)
- c. In rolling a slab from 35 to 30 mm calculate the coefficient of friction and the length of arc of contact. Take the value of roll radius as 250 mm. (05 Marks)

PART – B

- 5 a. What is drawing process? Explain. (05 Marks)
- b. What are the drawing variables? Explain briefly. (05 Marks)
- c. Classify the different process used in tube drawing. With the help of suitable sketch, explain any one process. (05 Marks)
- d. Explain optimal cone angle and dead zone formation in drawing. (05 Marks)
- 6 a. Give the classification of extrusion process and explain hydrostatic extrusion process with neat sketch. (07 Marks)
- b. Explain clearly the variables influencing extrusion process. (07 Marks)
- c. It is required to extrude a cylindrical aluminum billet of 50 mm diameter to 10 mm diameter. The length of the billet is 75 mm and the average tensile yield stress for aluminum material is 170 N/mm². Calculate the force required for extrusion. Assume $\mu = 0.15$ and semi-die angle = 45°. (06 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.

- 7 a. With neat sketch, explain the working of “progressive” and “compound die” arrangement in sheet metal working. (10 Marks)
- b. Explain the forming limit diagram. (05 Marks)
- c. A 25 mm square hole is to be cut in sheet metal of 0.75 mm thick. The shear strength of the material is 2.86×10^5 kN/m². Calculate the cutting force. (05 Marks)
- 8 a. Discuss the principle of working, advantages and application of:
- i) Explosive forming (10 Marks)
- ii) Electro hydraulic forming (05 Marks)
- b. Explain the “atomization” method of powder production in powder metallurgy. (05 Marks)
- c. What is “sintering”? Explain its mechanism. (05 Marks)

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