USN [   ]

Fifth Semester B.E. Degree Examination, June/July 2016
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. Give the broad classification of metal working processes.   (04 Marks)
    b. Explain Tresca and Von-Mises yield criteria.   (08 Marks)
    c. The state of stress at a point is given by, $\sigma_x = 70$ MPa, $\sigma_y = 120$ MPa, $\tau_{xy} = 35$ MPa. If the yield strength of the material is 125 MPa, determine in a uniaxial tensile test, whether yielding will occur according to Tresca's and Von-Mises yield conditions or not.   (08 Marks)

2   a. List and explain various process parameters affecting on the metal working processes.   (10 Marks)
    b. Define and explain the concept of workability.   (06 Marks)
    c. Write a note on deformation zone geometry.   (04 Marks)

3   a. With simple sketches, explain different types of forging operations.   (08 Marks)
    b. Explain various die-design parameters.   (06 Marks)
    c. A block of lead $25\text{mm} \times 25\text{mm} \times 150\text{mm}$ is pressed between flat dies to a size of $6.25\text{mm} \times 100\text{mm} \times 150\text{mm}$. If the uniaxial flow stress is $\sigma_0 = 6.9\,\text{MPa}$ and $\mu = 0.25$. Determine the pressure distribution over the 100 mm dimension.   (06 Marks)

4   a. List and explain different types of rolling mills.   (10 Marks)
    b. Briefly explain different types of rolling variables.   (05 Marks)
    c. What are the problems and defects occurred in rolled products?   (05 Marks)

PART – B

5   a. With a simple sketches, explain the drawing die.   (05 Marks)
    b. List and explain different methods of tube drawing.   (10 Marks)
    c. What is the percentage contribution of friction to the drawing stress at 40% reduction of area using two lubricants having co-efficient of friction value, $\mu = 0.05$ and $\mu = 0.1$ with $\alpha = 15°$ die and a fixed parallel plug.   (05 Marks)

6   a. Sketch and explain basic types of extrusion.   (10 Marks)
    b. Explain the different methods used in the production of seamless pipes and tubes.   (10 Marks)

7   a. Sketch and explain a progressive die used for the production of washer.   (08 Marks)
    b. Explain how a cylindrical cup is formed.   (06 Marks)
    c. Explain the concept of forming limit criteria.   (06 Marks)

8   a. Sketch and explain explosive forming.   (06 Marks)
    b. Explain the different methods used for the production of metal powders in powder metallurgy.   (08 Marks)
    c. List the advantages, limitations and applications of powder metallurgy.   (06 Marks)