R13

Code: 13A03504

B.Tech III Year I Semester (R13) Supplementary Examinations June 2016
METAL FORMING PROCESSES
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
  (a)   Differentiate between true stress and normal stress.
  (b)   Explain the effect of temperature on the shape of stress-strain curve.
  (c)   Define slip and draft in the case of rolling.
  (d)   What are the advantages of press forging over drop forging?
  (e)   Explain about the various rolling products.
  (f)   Explain the difference between direct extrusion and indirect extrusion.
  (g)   What is spring back in sheet metal bending?
  (h)   Describe Spinning process with a neat sketch.
  (i)   Explain the principle of injection molding.
  (j)   Explain the principle of compression molding.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2   (a) What are the purposes for which metals are subjected to mechanical working?
    (b) Distinguish between cold working and hot working with their merits and demerits.
OR
3   (a) State and explain about Von mises yield criteria.
    (b) Describe recovery, recrystallization and grain growth phenomena in metal working process.

UNIT – II

4   (a) In a single pass rolling operation a 20 mm thick plate with plate width 100 mm is reduced to 18 mm. The roller radius is 250 mm and rotation speed is 10 RPM. The average flow stress for the plate material is 300 MPa. What is the power required for the rolling operation in kW?
    (b) With a neat sketch explain rolling with: (i) Four high rolling mill. (ii) Cluster rolling mill.
OR
5   (a) Describe the working principle of roll forging with the help of neat sketches.
    (b) List out the four common defects which occur in forging operation and discuss the causes and their remedies.

UNIT – III

6   Explain hydrostatic extrusion and impact extrusion with sketches. Mention their areas of applications.
OR
7   (a) Explain the effect of optimum die angle in wire drawing process.
    (b) A cup is to be drawn to a diameter of 70 mm with 35 mm depth from a 0.5 mm thick sheet metal. The cup is drawn in one operation. Assume σ_u = 490 MPa. Calculate the required blank diameter and the maximum drawing force.

UNIT – IV

8   Briefly explain the various sheet metal working operations performed in a workshop. Indicate clearly the types of stresses induced in these operations.
OR
9   (a) With aid of neat sketches explain different types of bending operations
    (b) Distinguish between blanking and piercing operations

UNIT – V

10   With the help of suitable figures, explain the blow moulding process. Mention its applications and advantages.
OR
11   What are the various rapid prototyping methods? Explain the process of fusion deposition modeling