(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3990 Roll No.

B. Tech.

(SEMESTER-IV) THEORY EXAMINATION, 2011-12

MANUFACTURING SCIENCE-I

Time : 3 Hours] *[Total Marks : 100*

Note : Attempt questions from **all** Sections as directed.

SECTION – A

1. Answer **all** the questions : **10 × 2 = 20**

   (a) Name different types of manufacturing process.

   (b) What is gatorizing ?

   (c) Compare among cold, warm and hot working of metals.

   (d) What is the rolling load when front and back tensions of 120 and 150 MPU are applied ? $\sigma 0 = 13$ kN/mm^2 and $\alpha = 2\beta$.

   (e) Write about latch stop.

   (f) What is a shaving ?

   (g) What are the parameters controlling the explosive forming ?

   (h) Explain briefly about plasticizers.

   (i) Write the basic steps of the casting process.

   (j) What are different pattern allowances ?

SECTION – B

2. Answer any **three** of the following: **3 × 10 = 30**

   (a) (i) What are the defects in forging ?

   (ii) Explain about incremental forging.

   (b) Explain briefly the following with neat sketches.

   (i) Roll forming

   (ii) Tube making by rotary piercing

   (iii) Stretch forming

(c) (i) Derive the equation for bending forces generated in sheet metal process.

(ii) Calculate the bending forces required for a C50 steel 1.5 mm sheet of width 1 m to be bent in a wiping die. The die radius used is 3 mm.

(d) What are the design considerations of powder metallurgy ? Explain.

(e) An aluminium cube of 12 cm side has to be cast along a cylindrical riser of height equal to its diameter. The riser is not insulated on any surface. If the volume shrinkage of aluminium during solidification is percent; calculate :

(i) Shrinkage volume of cube on solidification.

(ii) Minimum size of the riser so that it can provide the shrinkage volume.

SECTION – C

Answer **all** the questions with internal choice : **5 × 10 = 50**

3. What are the different types of forging machines ? Explain any two with neat sketches.

OR

(a) Differentiate the cold working and hot working process.

(b) Explain about warm working process.

4. Briefly explain about principle and mechanism of rolling process.

OR

Explain any wire drawing process and also explain mechanics of wire drawing.

5. (a) A hole 100 mm diameter is to be punched in a steel plate of 6 mm thick. The material is a cold rolled C40 steel for which the maximum shear strength can be taken as 550 MPa. With normal clearance on the tools, cutting is complete at 40% penetration of the punch. Give suitable diameters for the punch and die, and shear angle on the punch in order to bring the work within the capacity of a 200 kN press available in the shop.

(b) Write about air vent solid stop.

OR

(a) Differentiate between blanking and piercing.

(b) Explain different types of die stops with the aid of neat sketches.

6. (a) Explain briefly about electromagnetic forming, mention its advantages and its applications.

(b) Distinguish between explosive forming and electro-hydraulic forming process.

OR

Explain the working principle, advantages and disadvantages of Injection Moulding process.

7. What is a centrifugal casting ? Explain about different types of centrifugal casting methods.

OR

(a) What is a gating system ? Explain its design requirements.

(b) Discuss briefly the materials which are added to moulding sand to improve their moulding properties.
