

(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

- Name different types of manufacturing process.
- What is gatorizing ?
- Compare among cold, warm and hot working of metals.
- What is the rolling load when front and back tensions of 120 and 150 MPU are applied ? $\sigma_0 = 13 \text{ kN/mm}^2$ and $\alpha = 2\beta$.
- Write about latch stop.
- What is a shaving ?
- What are the parameters controlling the explosive forming ?
- Explain briefly about plasticizers.
- Write the basic steps of the casting process.
- What are different pattern allowances ?

SECTION – B

2. Answer any three of the following:

3 × 10 = 30

- What are the defects in forging ?
 - Explain about incremental forging.
- Explain briefly the following with neat sketches.
 - Roll forming
 - Tube making by rotary piercing
 - 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.