Printed Pages—3   **ME402**

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

PAPER ID : 140406 | Roll No. | 1 | 2 | 0 | 3 | 2 | 4 | 0 | 0 | 3 | 9 |

B.Tech.
(SEM. IV) THEORY EXAMINATION 2013-14
MANUFACTURING SCIENCE –I

Time : 3 Hours   *Total Marks : 100*

Note :– Attempt **all** the questions as directed.

SECTION–A

1. Answer **all** parts :   (2×10=20)

    (a) Classify Manufacturing Process.

    (b) Define Recrystallisation.

    (c) Define forgeability. How can it be tested ?

    (d) Differentiate between Plane Stress and Plane Strain.

    (e) Define the terms, Angle of Bite and Neutral Plane in Rolling.

    (f) Write down different Pattern Allowances.

    (g) Define Notching and Nibbling operations.

    (h) What is Curing in Plastic ?

    (i) Write the basic steps of Casting.

    (j) Differentiate the basic difference between Hot working and Cold working.

SECTION–B

2. Attempt any **three** of the following :   (10×3=30)

    (a) Differentiate between open and closed die forging with their advantages and disadvantages. Also explain the defects in forging.

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(b) What is extrusion ? Explain all the types with a neat sketch.

(c) Differentiate between jigs and fixtures. Also explain the types of Jigs with neat sketch.

(d) Differentiate between punching and blanking. Also derive the relation between force applied by punch having flat face and that having shear.

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

SECTION–C

3. Attempt **all** parts with internal choice : (10×5=50)

(a) What are different types of dies used in sheet metal forming. Explain any two with neat sketch.

OR

A metal component 25 mm × 25 mm × 150 mm long having a yield stress of 7 MPa in tension, is to be pressed between flat dies to a size 6 mm × 100 mm × 150 mm. If $\mu = 0.2$ then calculate the maximum forging load.

(b) Describe the Gating system in casting with neat sketch and prove the volume/area ratio for most compact economic

side riser of height h diameter d/6 and $\dfrac{d}{n}$ ratio 1.

OR

Explain Die Casting with neat sketch. Also explain all the casting defects briefly.

(c) Briefly explain principle and mechanism of rolling process. Also derive the relation for max draft obtained in rolling process.

OR

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Explain the working principle, advantages and disadvantages of injection moulding process.

(d) What is a centrifugal casting ? Explain about different types of centrifugal casting methods.

OR

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

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

(e) A hole 100 mm diameter is to be punched in a steel plate of 6 mm thickness. The material is cold rolled C_{40} steel for which maximum shear strength can be taken as 550 MPa. with normal clearance on the tools, cutting is competed at 40% penetration of punch. find diameters of punch and dies and shear angle on the punch in order to bring the work within the capacity of a 200 kN press available in shop.

OR

Explain all the type of moulding sand and discuss briefly the materials added to moulding sand to improve their moulding properties.

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