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

Paper ID : 140409          Roll No.

## B.TECH.

Theory Examination (Semester-IV) 2015-16

## MANUFACTURING SCIENCE & TECHNOLOGY I

*Time : 3 Hours*                              *Max. Marks : 100*

### Section-A

1.    Attempt ALL parts of the following:          (10×2=20)

   (a)    Differentiate between hot working and cold working.

   (b)    What is forging? What arc different forging operations?

   (c)    Differentiate between combination die and compound die.

   (d)    What arc various inspection methods in casting?

(1)                              P.T.O.

(e)     What is gating system?

(f)     Differentiate between direct and indirect extrusion.

(g)     What are the defects in metal forming?

(h)     What is bending allowance?

(i)     What is non-conventional metal forming process?

(j)     What is draft in rolling?

## Section-B

2.     **Attempt any FIVE questions from this section.**

$$(5\times10=50)$$

(a)     (i)     Whal are the assumptions in yield criteria? Explain Tresca's yield criteria and Von miscs yield citcria.

(ii)     What is powder metallurgy? Describe various steps involved.

(b)     What is electromagnetic forming process? What are its advantages and applications?

(c)     Derive the expression for load estimation with sliding fiction and sticking friction for slab of forging process.

(2)

(d) What is pattern allowance? Why is it given? Describe various types of allowance.

(e) Differentiate between jigs and fixtures. Discuss the principle of locating and clamping a work piece with neat sketches.

(f) Discuss the analysis of wire drawing. Derive an expression for maximum reduction in drawing.

(g) What is rolling mill? Explain different types of rolling mills with diagram.

(h) What is explosive forming process? Explain briefly with suitable diagram? What are its applications?

## Section-C

**Attempt any TWO questions from this section. (2×15=30)**

3. **Attempt ALL parts of the following :** (3×5=15)

(a) Discuss the difference between cup drawing, deep drawing and bending.

(b) Describe a die-punch assembly.

(e) What are punching, piercing, shearing and blanking operations? Explain with proper diagram.

4. **Attempt ALL parts of the following :** (3×5=15)

(a) Draw a properly labelled sketch of a cupola and write a brief account of its operation.

(b) Explain blow moulding method of processing plastics.

(c) What is moulding sand? What are the characteristics of moulding sand?

5. **Attempt ALL parts of the following :** (3×5=15)

(a) Calculate the force to cut a blank 30 mm wide x 35 mm long from a 2mm thick metal piece. Assume ultimate shear stress of the material as 450 N/mm². Also find the work done if the percentage is 30% of the material thickness.

(b) With a solidification factor of $0.97 \times 10^6$ s/m², find the solidification time in seconds for a spherical casting of 200 mm diameter.

(c) Describe the importance for manufacturing for economic and technological considerations.

(4)