B.TECH.
THEORY EXAMINATION (SEM–IV) 2016-17
MANUFACTURING SCIENCE-I

Time : 3 Hours   *Max. Marks : 100*

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. **Explain the following:**   **10 x 2 = 20**
    - **(a)** Classify Manufacturing process.-
    - **(b)** Define Recrystallisation.
    - **(c)** Define forgeability.
    - **(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

SECTION – B

2. **Attempt any five of the following questions:**   **5 x 10 = 50**
    - **(a)** Differentiate between open and closed die forging .What are the advantages and disadvantages. Explain the defects in rolling operation.
    - **(b)** Differentiate between jigs and fixture. Also explain the types of Jigs with neat sketch.
    - **(c)** Differentiate between punching and blanking. Also derive the relation between force applied by punch having flat face and that having shear.
    - **(d)** What are the design considerations of powder metallurgy?
    - **(e)** State Tresca's and Von Mises' criteria for plastic deformation. Derive a suitable expression for both criteria.
    - **(f)** What are different types of dies used in sheet metal forming? Explain any two with neat sketch.
    - **(g)** Describe the Gating system in casting with neat sketch.
    - **(h)** Briefly explain principle and mechanism of rolling process. Also derive the relation for max draft obtained in rolling process.

SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3   From first principles, derive the formula for the extrusion of wire with friction where σ refers to the stress in wire at inlet to the die, D_B and D_a are the inlet and outlet diameters of the wire, B=$\mu cot\alpha$ (μ is coeff. of friction and α is half die angle) and K is the critical shear stress.

4   (i) Write a note on rolling defects indicating the defects, their causes and remedies. (ii) Calculate the bite angle when rolling 15mm thick plates using rolls of 400 mm. diameter, Final thickness of plates 12mm.

5   Derive an expression of radial stress in deep drawing of a cup.