

(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

Note: Attempt questions as per instructions

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- 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 are different forging operations?
 - (c) Differentiate between combination die and compound die.
 - (d) What are various inspection methods in casting?

- (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. (5×10=50)**
- (a) (i) What are the assumptions in yield criteria? Explain Tresca's yield criteria and Von mises yield criteria.
 - (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.

- (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?

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.
- (c) 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/mm^2 . Also find the work done if the percentage is 30% of the material thickness.
- (b) With a solidification factor of $0.97 \times 10^6 \text{ s/m}^2$, 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.