



Printed Pages : 4

TME – 403

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

PAPER ID : 4081

Roll No.

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B. Tech.

(SEM. IV) EXAMINATION, 2008-09

MANUFACTURING SCIENCE - I

Time : 3 Hours]

[Total Marks : 100

- Note :** (1) Attempt **all** questions.
(2) All questions carry **equal** marks.
(3) Be precise in your answer.
(4) No second answer book will be provided.

1 Attempt any **four** parts of the following : 5×4

- (a) Discuss briefly the importance of manufacturing in 21st century in India.
- (b) What is manufacturing? How will you classify manufacturing processes? Give suitable example of products being made by manufacturing processes.
- (c) Describe the elastic and plastic behavior of metals. Also discuss the factors affecting the plastic deformation.



- (d) What do you understand by yield's criteria for ductile materials? Find out the relation between Von-Mises' and Tresca yield criteria.
- (e) Enlist the various hot and cold working processes. Compare the advantages and disadvantages of the hot and cold working processes.
- (f) Derive the equation for the pressure distribution for the forging of rectangular block (bxhxw) in case of sliding friction.

2 Attempt any **two** parts of the following :

10×2

- (a) Determine the maximum forging load of a metallic component 25mm × 25mm × 150mm. The yield stress in simple tension is 7MPa. The component is pressed between flat dies to a size 6mm × 100mm × 150 mm. The coefficient of friction $\mu = 0.20$. Consider the mixed friction case.
- (b) Prove that in case of rolling,

$$\text{Max.Draft} = \mu^2 R,$$

Where, μ is the coefficient of friction, R is the radius of roll.

- (c) List and explain the defects commonly observed in metal forming processes.



3 Attempt any **two** parts of the following : 10×2

- (a) With the help of neat sketch, compare the compound die with progressive die. Give a neat sketch, describe constructional features and working of progressive die.
- (b) How can the cutting force be reduced in blanking operation? Estimate the blanking force to cut a blank of 25mm wide and 30mm long from a 1.5mm thick metal strip, if the ultimate shear stress of the material is 450 N/mm². Also determine the work done, if the percentage penetration is 25% of the material thickness.
- (c) What is the difference between blanking and piercing? Explain with neat sketch, deep drawing process.

4 Attempt any **two** parts of the following : 10×2

- (a) Write short notes on
 - (i) Explosive forming
 - (ii) Electro hydraulic forming process
- (b) Explain the basic steps of the powder metallurgy process. Explain in brief about "Sintering". Why sintering is done in a controlled manner?
- (c) Write short notes on
 - (i) Welding of plastics
 - (ii) Resins and Adhesives.



5 Attempt any **two** parts of the following : **10×2**

- (a) Explain the design consideration of open and closed riser.
- (b) Explain with neat sketch various types of patterns. Discuss pattern allowances.
- (c) Write short notes on :
 - (i) Investment casting
 - (ii) Centrifugal casting.

