Printed Pages: 4 **ME-402**

(Following Paper ID and Roll No. to be filled in your Answer Books)	
Paper ID : 140406	**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. Write in short. (2×10=20)

(a) State Tresca's and Von Mises criteria for plastics deformation.

(b) Write short notes on economic and technological considerations in manufacturing.

(c) Differentiate elastic and plastic deformation.

(d) What is the role of mass manufacture in raising the standard of living of human beings?

(e) Enlist various hot working and cold working processes.

(f) Enlist defect in rolling process.

(g) What do you mean by aspiration effect in casting?

(h) Write short note on misrun and cold shut.

(i) What do you mean by sintering in powder metallurgy?

(j) Differentiate between punching and blanking.

Section-B

Note : Attempt any five parts of the following: (10×2=50)

(a) Derive the expression for drawing stress σ_{xa}, for wire drawing through a conical die of die angle 2α and coefficient of friction is μ as:

$\frac{\sigma_{xa}}{2k} = \frac{1+B}{B}\left[1-\left(\frac{D_a}{D_b}\right)^{2B}\right]$, Where D_a and D_b are exit and inlet diameter of wire.

(b) Derive the following expression for the forging of disc with sliding condition :

(Where R = radius of disc & h = thickness)

$P_1 = \sqrt{3}\, Ke^{\frac{2\mu}{h}(R-r)}$

(c) What are yield criteria? Differentiate between hot working and cold working process.

(d) What do you mean by friction hill rolling? Explain the mechanism of rolling process with neat sketch. Prove that maximum possible draft in case of strip rolling can be expressed as: $(h_b - h_a) = \mu^2 R$

(e) A metal component 24mm×24mm×150mm long having a yield stress of 7MPa, is to pressed between flat dies to a size 6mm×96mm×150mm. If μ=0.2 then calculate the maximum forging load.

(f) How powder metallurgy is different from other manufacturing processes. How is powder metallurgy components manufactured? Discuss various steps involved. Also mention some application of powder metallurgy.

(g) What is the unconventional metal forming process? Enlist unconventional metal forming process and briefly describe with neat sketch, working and application of explosive forming.

(h) Described the process of deep drawing. What property should the material possess, show that sheet of this material may undergoing deep drawing processes successfully? Also mention the some defects of deep drawing operation.

Section-C

Note: Attempt any two parts of the following: (2×15=30)

3. In a wire drawing operation initial wire dia. is 6 mm. and final wire dia. is 5.5 mm. the half die angle $\alpha = 10^0$. Find the drawing stress considering friction if $\mu=0.1$ and K = 18 MPa. Also calculate the maximum possible reduction.

4. Describes in brief of the following:

   (i) 3-2-1 principle of location

   (ii) Drill bushes

   (iii) Diamond pin locator

5. Explain in brief of the following with neat diagram:

   (i) Investment casting process with its application

   (ii) Common defects found in casting and remedies