Printed Pages—4   EME—402

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

PAPER ID : 3990   Roll No. | | | | | | | | | |

B.Tech.

(SEM IV) EVEN SEMESTER THEORY EXAMINATION, 2009-2010

MANUFACTURING SCIENCE - I

Time : 3 Hours   Total Marks : 100

Note : Attempt **ALL** questions.

1.   Attempt **any four** of the following :   (4x5=20)

(a)   What are the major classifications of basic manufacturing processes ?

(b)   Explain difference between Formability and Machinability.

(c)   What do you understand from the term "Technological   considerations   in manufacturing" ?

(d)   Why material's selection is important in manufacturing ?

(e)   What is Manufacturing system ?

2. Attempt **any four** parts of the following : (4x5=20)

(a) Explain difference between Elastic deformation and Plastic deformation.

(b) Briefly, explain Tresa's yield criteria.

(c) Describe the factors affecting plastic deformation.

(d) Describe some common defects in rolling with remedial measures.

(e) Explain :

(i) Forward extrusion

(ii) Impact extrusion

3. Attempt **any two** parts of the following : (2x10=20)

(a) A hole of 100 mm is to be punched in a cold rolled medium carbon steel plate of 5.6 mm thickness. The ultimate shear strength of plate material is 550 MPa. With normal clearance on the press tool, cutting is completed at 40% penetration of the punch. Calculate the diameters for the punch and die required for the purpose. If the shop has press of 30 tonnes capacity, calculate the shear angle to be provided on the punch in order to bring the work within the capacity of the existing press.

(b) How does a compound die differ from a progressive die ? Giving a neat sketch, describe constructional feature and working of a compound die.

EME – 402　　　　　2

(c) Prove through analysis of deep drawing of cup the radial stress σ_r at radius r is given by

$$\frac{\sigma_r}{2k} = \frac{\mu F_n}{2\pi k r_j t} + \log e \frac{r_j}{r}$$

Also show that the limiting case for fracture at bottom is given by

$$e^{-\mu \pi/2} = \frac{\mu F_n}{2\pi k r_j t} + \log e \frac{r_j}{r_d}$$

Where F_n is blank holding force r_j is initial blank radius , rd is die radius, k is yield shear strength, t is plate thickness and μ is coefficient of friction which occurs at the edge between blank and holders and between blank and die corner.

4. Attempt **any two** parts of the following : (2x10=20)

(a) What is unconventional metal forming processes ? Briefly describe with neat sketch electrohydraulic forming process.

(b) Write short notes on :

(i) Powder – metallurgy process

(ii) Pre – sintering

(c) Write short notes on :

(i) 3 - 2 - 1 principle of location

(ii) Jig and fixture

EME – 402   3   *[Turn Over*