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TME-403

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

PAPER ID : 4081

Roll No.

B. Tech.

(SEM. IV) EXAMINATION, 2007-08

MANUFACTURING SCIENCE - I

Time : 3 Hours]

[Total Marks : 100

Note : (1) Attempt **all five** questions as instructed their.
(2) There are choices within. Marks are indicated therein. Answer briefly.

1 Answer part (d) and any **two** more from the remainings :

- (a) Why yield criteria is needed ? Show that shear strength K and tensile strength σ_0 are related as $K = \sigma_0 / 2$ and $K = \sigma_0 / \sqrt{3}$ through Tresco's and Miser' yield criteria respectively. 5
- (b) What are the limitations of open-die and closed-die forging processes ? Explain closed-die forging in brief. 5
- (c) Explain various regimes of cold working and hot working in terms of melting point of the material being formed. 5
- (d) Derive a relation to obtain the forging force to forging of circular disc with sliding friction condition. 10

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2 Answer part (d) and any **two** more from the remainings :

- (a) What do you mean by maximum allowable reduction in wire drawing ? A wire of 1 mm is to be drawn from a rod of 5 mm through a conical frictionless die. How many draws are needed ? 5
- (b) Briefly describe with the help of sketch types of extrusion. List some parts which are made by extrusion. 5
- (c) What are common defects which occurs during forming operations ? Explain in brief. 5
- (d) Explain neutral point in rolling. What is the role of friction before and after neutral point ? Also derive a relation to obtain driving power in rolling. 10

3 Answer any **four** parts :

- (a) Explain the similarities and difference between piercing and blanking. 5
- (b) Explain spring back, in bending of sheet and how it is compensated. 5
- (c) How washers could be made and what types of dies would be employed ? 5
- (d) What do you mean by shearing ? What measures can be employed to improve the quality of a sheared edge ? 5
- (e) Explain briefly the analysis of deep drawing to find drawing force needed OR Explain various deep drawing defects. 5



4 Answer any **four** parts :

- (a) Explain the mechanics and process of electromagnetic forming. 5
- (b) Explain the advantages and applications of powder metallurgy in brief. 5
- (c) Explain different types of locating and clamping devices. 5
- (d) Explain how plastic components are produced by extrusion. 5
- (e) Write short notes on any **two** of the following : $2\frac{1}{2} \times 2$
- (i) Automization in powder metallurgy
- (ii) Resin and adhesive
- (iii) Application of Jig and Fixture.

5 Answer any **four** parts :

- (a) What are different types of pattern allowances ? Explain any one. 5
- (b) Explain "Spree" and "Gati and Runner" as related to casting. 5
- (c) Distinguish between green sand molds and dry sand moulds. 5
- (d) What is the main purpose of Riser ? Explain the consideration for riser design. 5
- (e) Explain the mechanics of solidification in casting of alloys in brief. 5
- (f) Explain in brief the centrifugal casting methods. 5

