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Printed Pages : 3 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, 2006-07

MANUFACTURING SCIENCE - I

Time : 3 Hours] *[Total Marks : 100*

Note : *(1) Attempt **all 5** questions as instructed therein.*

(2) There are choices within. Marks are indicated therein. Answer briefly.

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

(a) What do you understand by yield criteria? Explain Tresea's yield criteria and compare it with Von-Mises' yield criterion. **5**

(b) What are the advantages of open-die and closed-die forging process? Explain open-die forging process in brief. **5**

(c) Explain some advantages and disadvantages of cold working in light of hot working. **5**

(d) Derive a relation to determine the forging force for forging of rectangular strip with sticking friction condition. **10**

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

(a) What is the difference between drawing and extrusion? What types of defects may occur in drawing and extrusion? **5**

(b) Derive expression for drawing stress σ_{xa} for wire drawing through a conical die of die angles 2α and coefficient of friction μ, as $\sigma_{xa} = \frac{1+B}{B}\left[1-\left(D_a / D_b\right)^{2B}\right]$ where $B = \mu$. **5**

(c) Explain in brief major effect of friction in forming operations and also the role of lubrication in forming operations. **5**

(d) What do you mean by friction hill rolling? Derive a relation to determine roll separating force. **10**

3 Answer any **four** parts :

(a) On what factors the selection of press for shut metal forming operation depend? **5**

(b) Describe the difference between compound and progressive dies. Illustrate with sketch and an example. **5**

(c) With the help of neat diagram explain in brief the deep drawing operation. **5**

(d) What are different types of press? Explain any one. **5**

(e) Explain flat-face and inclined face punch with neat sketches. **5**

4 Answer any **four** parts :

(a) What are the different methods by which high energy release rates can be obtained? Explain in brief. **5**

(b) List the different operations in sequence for powder metallurgy process. Explain in brief " sintering". **5**

(c) Why is there a need for flexible fixturing for holding work pieces? Are there any disadvantage? Explain. **5**

(d) Explain the important mechanical and physical properties of plastics and its uses. **5**

(e) Write short notes on any **two** of the followings : $2\frac{1}{2} \times 2$

(i) Principles of jigs and fixtures

(ii) Electro-hydraulic forming

(iii) Welding of plastics

5 Answer any **four** parts :

(a) What are different types of patterns? Explain single piece pattern. **5**

(b) Explain 'riser' and 'runner' as related to castings and compare riser versus runner. **5**

(c) Explain the essential properties of a moulding sand. **5**

(d) Explain in brief the mechanics of solidification of casting of pure metals. **5**

(e) Explain in brief the Die casting methods. **5**

(f) Sketch and briefly describe Cupola furnace. **5**
