

29/5/14 (M)

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

PAPER ID : 140403

Roll No.

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B.Tech.

(SEM. IV) THEORY EXAMINATION 2013-14

MANUFACTURING SCIENCE –I

Time : 3 Hours

Total Marks : 100

Note :- Attempt **all** questions.

1. Attempt any **two** parts : (10×2=20)
 - (a) What do you understand by yield criterion. Explain Tresca's yield criteria and compare it with Von-Mises yield criterion.
 - (b) Derive an expression for average pressure for forging of disc with sticking friction condition.
 - (c) Describe the Upsetting, Swaging, Punching, Drawing down and Roll forging operations.
2. Attempt any **four** parts : (5×4=20)
 - (a) In a drawing operation 30% reduction is to be obtained in an area of 15 mm dia wire. Determine the drawing load required with following data :
Die angle $\alpha = 12^\circ$ $\mu = 0.1$
Shear yield stress $k = 150 \text{ N/mm}^2$
Also calculate the power of motor if drawing speed is 3 m/s.
Take motor efficiency as 95%.
 - (b) Describe various tube drawing processes.

- (c) An alloy is hot extruded at 450°C through square dies without lubrication from 150 mm dia to 50 mm dia. The extrusion speed is 50 mm/s. The flow stress of material at the above temperature is 300 MPa. The length of Billet is 500 mm. Determine the extrusion load if coefficient of friction is 0.1.
- (d) Describe direct extrusion.
- (e) Describe various rolling defects.
- (f) State the functions of lubricants in metal forming processes. Describe Emulsion and Grease as lubricant.

3. Attempt any **four** parts : (5×4=20)

- (a) Explain Blanking, Notching and Lancing.
- (b) Explain combination die and progressive die.
- (c) A washer of 35.5 mm outer dia and 17.8 mm inner dia hole is to be made from 1.6 mm thick strip of material sheet. Take $c = 4\%$ of sheet thickness.
- (d) Describe re-drawing and ironing of a cup.
- (e) A cold rolled steel cup with an inside radius of 40 mm and thickness 4 mm is to be drawn from a blank of 50 mm. The yield stress in shear is 220 N/mm^2 and allowable stress in tension is 600 N/mm^2 . Determine the drawing force taking $\mu = 0.1$ and $\beta = 0.05$.
- (f) Describe V bending and Edge bending.

4. Attempt any **four** parts : (5×4=20)

- (a) State the applications of Electromagnetic forming.
- (b) Describe powder flowability and sprayability.
- (c) Describe Impregnation, Infiltration, Coining and Repressing.
- (d) Describe the principle of mutually perpendicular planes and principle of least points.
- (e) Describe solid heel clamp with a neat sketch.
- (f) Describe how the plastic bottles are made.

5. Attempt any **four** parts : (5×4=20)

- (a) Describe loose piece pattern and match plate pattern.
- (b) Describe loam moulds and metal moulds.
- (c) A mould $90 \text{ cm} \times 45 \text{ cm} \times 21 \text{ cm}$ is to be filled by liquid metal during sand casting. Determine the time taken during filling with top gating system. Cross section area of gate is 6 cm^2 and head is 21 cm.
- (d) Describe Dye-penetrant and Radiography methods of Inspection of casting.
- (e) State the advantages and limitations of Investment casting.
- (f) State the advantages and disadvantages of Die casting.