EME402

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

PAPER ID : 140403 **Roll No.** [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

B.Tech.

(SEM. IV) THEORY EXAMINATION 2013-14

MANUFACTURING SCIENCE –I

me : 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 $\alpha = 12°$ $\mu = 0.1$

   Shear yield stress $k = 150$ 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.

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 cm × 45 cm × 21 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.