17615

11920

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. (a) Attempt any THREE of the following : **12**

(i) What are the assumptions of merchant force circle.

(ii) List the different types of cutting tool material.

(iii) What is OBI press ? State its specifications.

(iv) What is spring back in bending operation ? State its causes.

(b) Attempt any ONE of the following : **06**

(i) Enlist different types of cutting fluids with their applications. State their characteristics.

(ii) Explain pressure die casting.

2. Attempt any FOUR of the following : **16**

(a) Define (i) Cutting ratio (ii) Chip reduction coefficient

(b) Why heat treatment is necessary for the tool steel ?

(c) What is meant by clearance ? Why it is important in shearing operation ?

(d) State the specification of carbide tips.

(e) State the two products each manufactured by using :

(i) Metal extrusion die

(ii) Forging die

(f) Write the classification of presses.

3. Attempt any TWO of the following : **16**

(a) Draw the geometry of single point cutting tool and explain its elements.

(b) What is strip layout ? List the factors influencing the stock layout.

(c) State the factors on which bending pressure depends ? How the size of a blank is calculated for drawing a cup ?

4. (a) Attempt any THREE of the following : **12**

(i) Explain the basic elements of metal cutting.

(ii) State any eight press operations.

(iii) How the metal flows during drawing ? What are variables affecting metal flow during drawing ?

(iv) Define forging. Write principle of cold die forging with neat sketch.

(b) Attempt any ONE of the following : **06**

(i) The certain orthogonal cutting process generate chip of thickness 0.53 mm. The feed of the tool is 0.2 mm/rev. and rake angle of 16; find :

(i) shear angle (ii) chip thickness ratio (iii) chip reduction coefficient

(ii) Explain with neat sketch process of making washer on progressive die.

5. Attempt any FOUR of the following : **16**

(a) List different types of chips produced during metal cutting process. Explain why discontinuous chips are preferred over continuous chips ?

(b) Explain most preferable metal cutting process with neat sketch.

(c) Explain combination die with neat sketch.

(d) Explain machinability and machinability index.

(e) What are the methods of bending ? Explain any one with neat sketch.

(f) What do you understand by set back and bend allowance ?

6. Attempt any TWO of the following : **16**

(a) Calculate the punch and die size of a steel washer 30 mm outside diameter with 15 mm hole from 1.6 mm thick steel sheet. The ultimate shear strength of the material is 32 kg/mm^2. The washer is made on progressive die. Assume 70% efficiency.

(b) (i) Explain factors affecting on tool life.

(ii) The useful life of certain cutting tool at 23 m/min is 4.2 Hrs. Calculate the tool life when tool operates at 32 m/min. Assume tool life exponential $\eta = 0.125$.

P.T.O.

(c) A sheet of 75 mm diameter is to be drawn and its height has to be 200 mm. Calculate the

(i) diameter of blank

(ii) the % reduction of each draw

(iii) number of draws

(iv) radius on punch and die
