

17615

15162

3 Hours / 100 Marks

Seat No.

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- 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.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any **THREE** :

(3 × 4) = 12

- (1) State different types of cutting fluid. List four desirable properties of cutting fluid.
- (2) Define tool wear and tool life. State any four factors affecting tool life.
- (3) What is the die clearance ? State the effect of excessive and insufficient clearance.
- (4) Define (i) bending allowance & (ii) springing.

(B) Attempt any **ONE** :

(1 × 6) = 6

- (1) Draw the sketch of single point V' tool and show on it :
 - (i) Flank, (ii) Rake angle (iii) Side rack (iv) Nose.
- (2) Explain with neat sketch back extrusion process. State its suitability.

2. Attempt any FOUR : **(4 × 4) = 16**

- (1) List the different metal cutting processes. What is utility of orthogonal cutting ?
- (2) List any eight shearing operations, that can be performed using punch and die.
- (3) Explain machinability and machinability index.
- (4) What is OBI press ? Describe function of flywheel in press.
- (5) Differentiate between direct and indirect extrusion.

3. Attempt any TWO : **(2 × 8) = 16**

- (1) 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 is 16° . Find (i) shear angle (ii) coefficient chip reduction, (iii) cutting ratio.
- (2) Explain with sketches following bending operation (i) Curling, (ii) Cup forming.
- (3) List the various die accessories. Describe any two with sketch.

4. (A) Attempt any THREE : **(3 × 4) = 12**

- (1) Compare press forging with drop forging.
- (2) Why cemented carbide is considered as an useful tool material ?
- (3) Determine the size of square hole to be punched in an M.S. plate 16 mm thickness. The ultimate shear strength of plate is 300 N/mm^2 . The permissible compressive stress in punch is 1200 N/mm^2 .
- (4) What is material utilization factor ? State its importance.

(B) Attempt any ONE :

(1 × 6) = 6

- (1) List different types of chips produced during metal cutting process. Why discontinuous chips are preferred over continuous chips ?
- (2) A sheet of 75 mm diameter is to be drawn and its height has to be 200 mm. How many drawing operation would be required, if there were an annealing operation in between ? Assume reduction of 50%, 40% and 30% etc. for each draw without annealing. Also determine height of each draw.

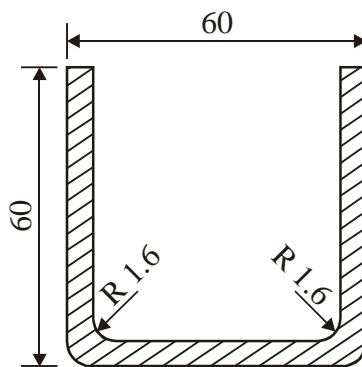
5. Attempt any FOUR :

(4 × 4) = 16

- (a) Define (i) Cutting ratio & (ii) Chip reduction coefficient.
- (b) What is spring back in bending operation ? State its causes.
- (c) The useful life of certain cutting tool at 23 m/min is 4.2 hours. Calculate the tool life when tool operates at 32 m/min. Assume tool life exponential $n = 0.125$.
- (d) Draw neat sketch of following operation :
 - (i) Stamping
 - (ii) FormingState two components produced by these operation.
- (e) Draw the merchant circle and state its utility.
- (f) The washers of 20 mm outer diameter and 8 mm inner diameter are to be made by press operation from M.S. sheet of 1 mm thickness. Calculate
 - (i) Clearance
 - (ii) Size of punch and die

6. Attempt any TWO :**(2 × 8) = 16**

- (a) Name any four tool materials. State at least four most important characteristics of good tool material. Which is better on above criterion amongst the four material listed above.
- (b) Draw neat label sketch of progressive die. write its construction and working.
- (c) A symmetrical cup work piece is shown in figure. Is to be made from 0.8 mm M.S. Sheet.



Calculate

- (i) Size of blank
- (ii) % Reduction
- (iii) Number of draw
- (iv) Radius of punch and die
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