

[3 Hours]

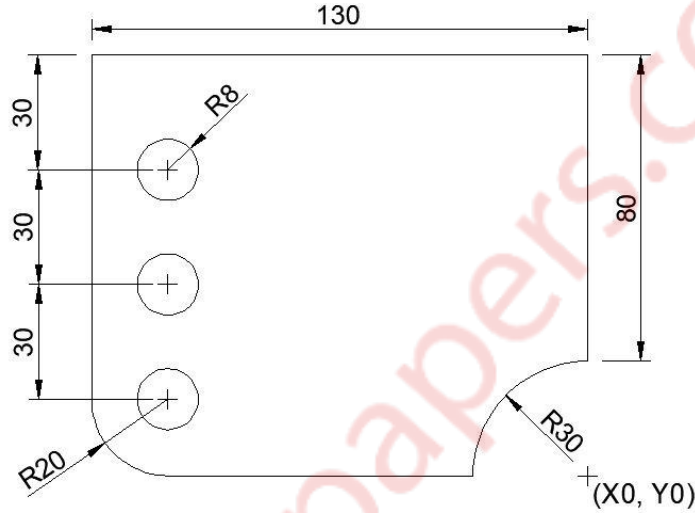
[Total Marks : 80]

Note:

1. Question 1 is Compulsory
2. Solve any three from remaining five
3. Figures to right indicate full marks
4. Assume suitable data if necessary

| Question No. |  | Max. Marks |
|--------------|--|------------|
| Q.1          | Explain any <b>Four</b> : <ol style="list-style-type: none"> <li>a) Feature based modeling technique used for 3D modeling.</li> <li>b) Procedure of creating scripts for API.</li> <li>c) Turning Canned Cycle.</li> <li>d) CIM tools used with reference to a manufacturing industry.</li> <li>e) Application of RP in Science and Medicine.</li> </ol> | 20         |
| Q.2          | a) Explain Cohen-Sutherland Clipping Algorithm.  | 10         |
|              | b) A triangle with vertices A ( 1 , 1 ) , B( 2 ,1 ) and C ( 2 , 3 ) has to be rotated by 30° counter clockwise about a point P ( 3 , 2 ). Determine the composite transformation matrix and the new coordinates of the triangle.   | 10         |
| Q.3          | a) Plot a Bezier curve having control points as P <sub>0</sub> (1, 2), P <sub>1</sub> (3, 4), P <sub>2</sub> (6, -6) and P <sub>3</sub> (10, 8). Take a step size of 0.2. Also find the midpoint of the curve.   | 10         |
|              | b) Explain Fused Deposition Modelling with its advantages, disadvantages and application.  | 10         |
| Q.4          | a) Find the transformed coordinates when a line (3, 4 , 1 ) , (4 , 2 , 2 ) is rotated about Z axis by an angle of 45° in anticlockwise direction.  | 10         |
|              | b) Differentiate between <ol style="list-style-type: none"> <li>i) SLA and SLS</li> <li>ii) Absolute and Incremental programming</li> </ol>  | 10         |

- Q.5 a) Explain the need of CIM and its database requirements. 10
- b) Write a CNC part program using G and M codes for contouring a component of thickness 10mm. Also drill holes of 16mm diameter as shown in figure. Assume cutter speed as 15m/min and feedrate as 0.2 mm/rev. 10



- Q.6 Write short note on: 20
- Window to Viewport Mapping
  - Artificial Intelligence in Design and Manufacturing
  - Fixture Component Technology
  - Parameter Optimization