

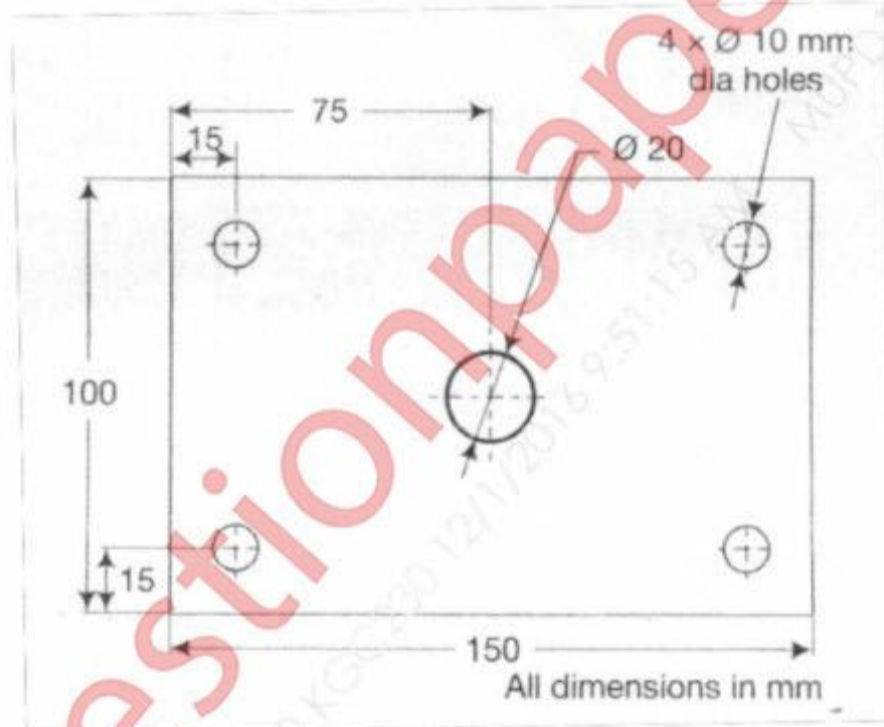


**N.B.:** 1) Q. No. 1 is compulsory.

2) Attempt any **three** questions out of remaining five questions.

3) Assume suitable data if required.

- Q1 a) What are the different types of equations used for curve representation? (5)  
 Explain with suitable example.
- b) Explain different types of wire frame models with neat sketches. (5)
- c) Explain different types of formats of manual part programming. (5)
- d) Explain any one rapid prototyping process. (5)
- Q2 a) Write a manual part program to drill all the holes for component as shown in (10)  
**Fig. 1.** Thickness of the component is 10 mm. Centre drill all holes before finish drill. Assume suitable speed and feed.



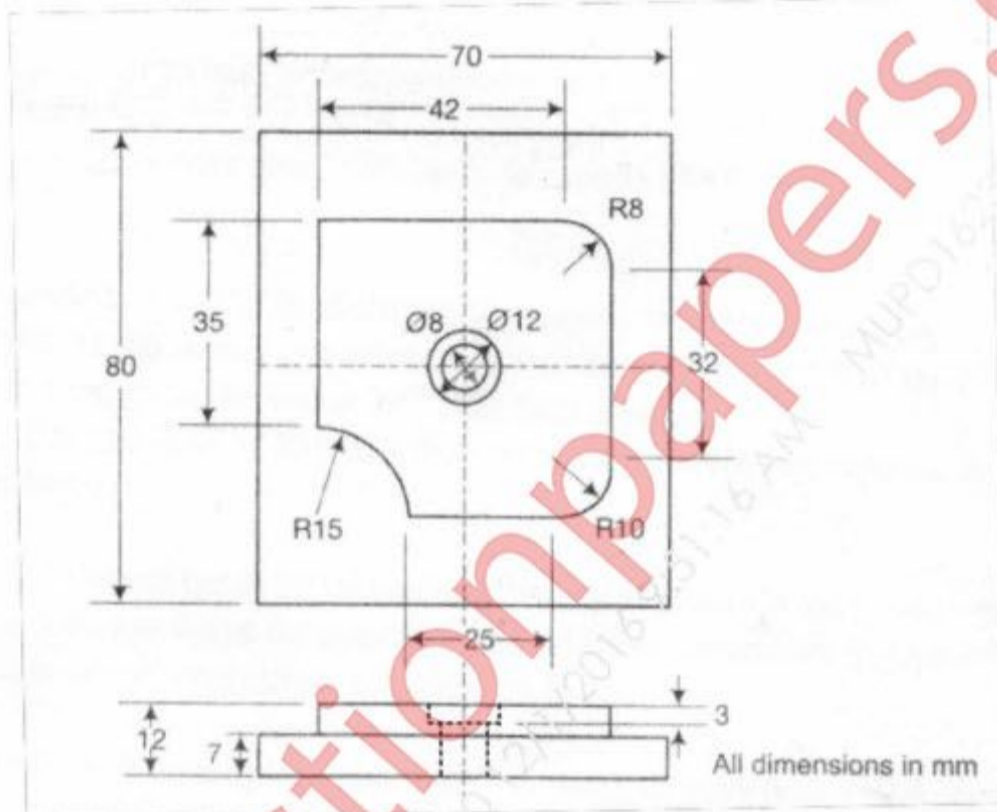
**Fig. 1**

b) A Bezier curve is defined by the points (1, 1), (2, 3), (4, 4), (6, 1). Find degree (10)  
 of the curve. Calculate the co-ordinates of the parametric mid-point of this  
 curve and slope at this point.

Q3 a) A triangle has vertices A (0, 0), B (4, 0) and C (2, 3). It is translated by 4 units (10)  
 in X-direction and 2 units in Y-direction. It is then rotated by  $90^\circ$  in  
 anticlockwise direction about the new position of point C. Find the new  
 vertices of a triangle.

b) A rectangular clipping window has lower left corner is at (1, 2) and the upper (10)  
 right corner at (9, 8). The co-ordinates of the points A, B, C, D, E and F are;  
 (11, 6), (11, 10), (6, 6), (8, 9), (2, 3) and (8, 4) respectively. Perform clipping  
 on the line segments AB, CD and EF using Cohen Sutherland algorithm.

- Q4 a) Find the matrix for mirror reflection with respect to a plane passing through the origin and having a normal vector whose direction is  $N = I + J + K$ . (8)
- b) Define CIM and explain nature & role of CIM elements. (8)
- c) Explain back-face removal algorithm. (4)
- Q5 a) Write a complete APT part program to machine the outline of the geometry shown in the top view up to a depth of 5 mm in one cut as shown in Fig. 2. The end mill used is 20 mm diameter. Assume suitable speed and feed for machining. (12)



**Fig. 2**

- b) Explain classification of rapid prototyping processes. (8)
- Q6 Write short notes on:
- a) Machining Center (5)
- b) RP applications (5)
- c) Benefits of CIM (5)
- d) CAE (5)