QP CODE : 793202

(3 hours) [Total marks: 80]

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? Explain with suitable example. (5)
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 **Fig. 1**. Thickness of the component is 10 mm. Centre drill all holes before finish drill. Assume suitable speed and feed. (10)

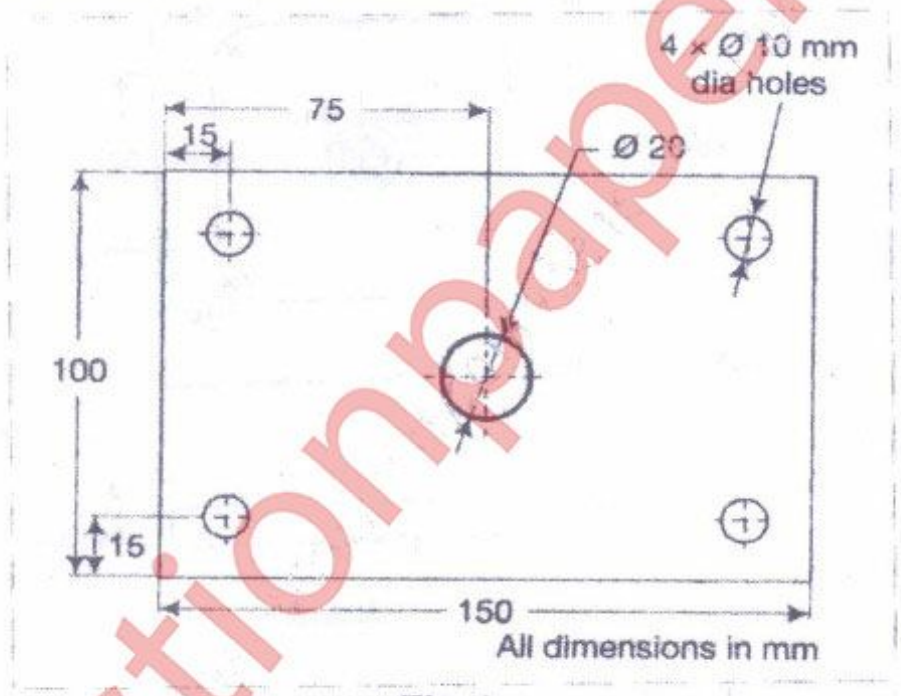

Fig. 1

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

Q3 a) A triangle has vertices A (0, 0), B (4, 0) and C (2, 3). It is translated by 4 units in X-direction and 2 units in Y-direction. It is then rotated by 90^0 in anticlockwise direction about the new position of point C. Find the new vertices of a triangle. (10)
b) A rectangular clipping window has lower left corner is at (1, 2) and the upper 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. (10)

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)

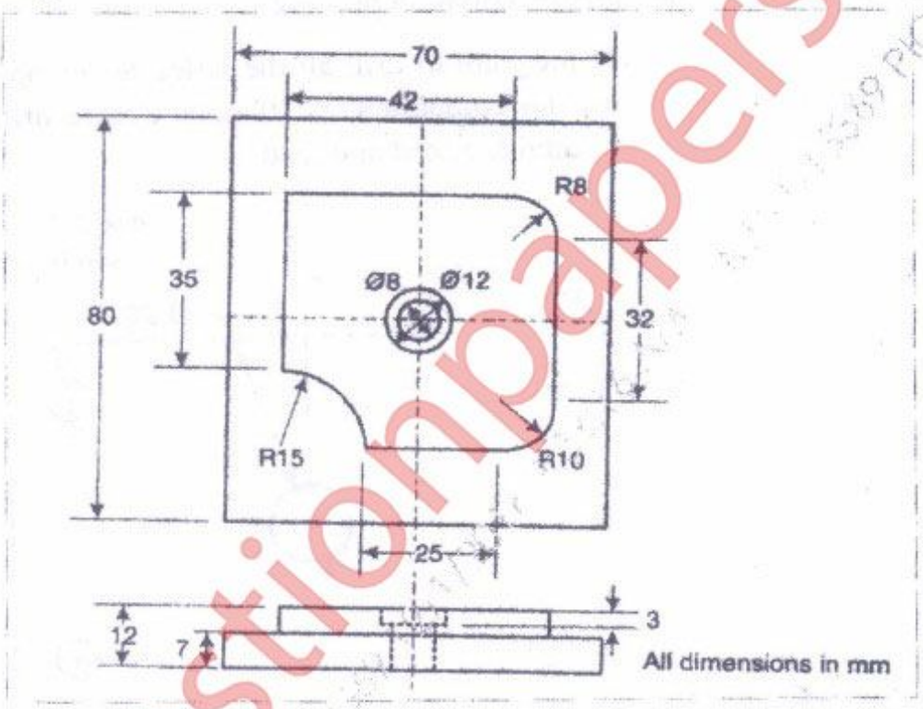

Fig. 2

b) Explain classification of rapid protyping processes. (8)

Q6 **Write short notes on;**

a) Machining Center (5)

b) RP applications (5)

c) Benefits of CIM (5)

d) CAE (5)
