[3 Hours]   **[Total Marks : 80]**
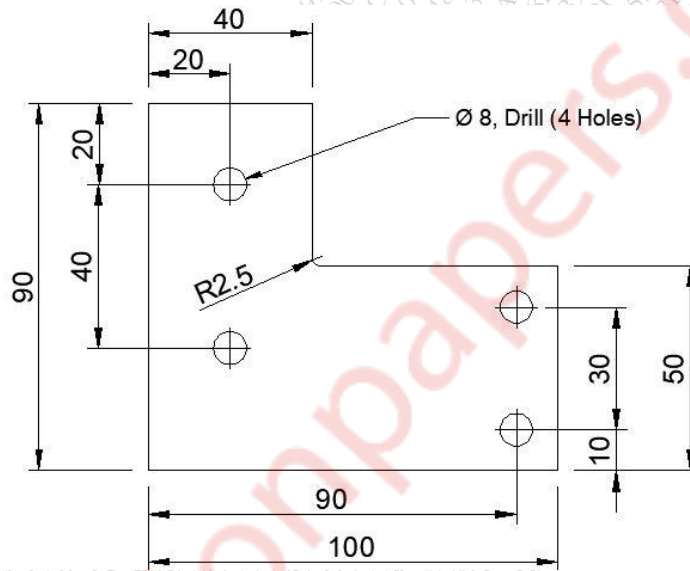
Note:

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 **Four**:	20
	a) Constructive Solid Geometry	
	b) Benefits of Artificial Intelligence	
	c) Velocity Feedback Devices	
	d) Obstacles for implementing CIM	
	e) Application of RP in MEMS	
Q.2	a) Explain Laminated Object Manufacturing with its advantages, disadvantages and application.	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 Beizer curve defined by the points (1, 1), (2, 3), (4, 4), and (6, 1).	10
	b) Parametric representation of curves and its benefits.	10
Q.4	a) Write a APT program to machine the component as shown in figure. Assume the component to be 15mm thick. The mill used is 10mm in diameter. Assume spindle speed as 800 rpm and feedrate as 240 mm/min.	10
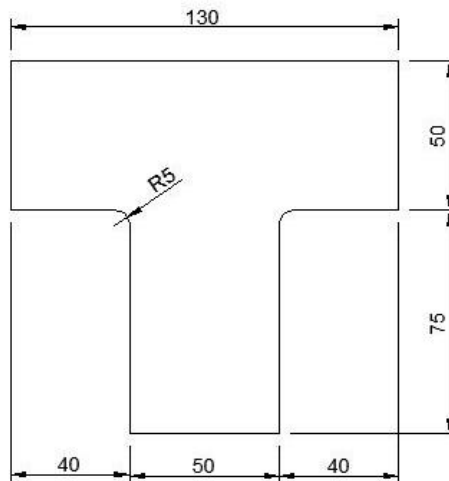
b) Find the transformation matrix which aligns vector V=ai+bj+ck in three dimension space along positive Z-axis.   10

Q.5   a) Write a CNC part program using G and M codes for drilling and milling an L – Bracket as shown in figure. Assume a 5mm diameter milling cutter and necessary drill sizes for drilling operation. Assume bracket thickness as 10mm, cutter speed as 15m/min and feedrate as 0.2 mm/rev.   10

b) Explain Concept of Future CIM Systems.   10

Q.6   Write short note on: 20

a) Hidden Line removal Algorithm

b) Knowledge based Engineering.

c) Turning Canned Cycle

d) Joints for Kinematic Analysis