Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

(Constituent Institute of Manipal University, Manipal)

V SEMESTER, B.E. (MECHANICAL ENGINEERING)
END SEMESTER (MAKE–UP) EXAMINATIONS – AUGUST 2008

SUBJECT: COMPUTER AIDED DESIGN (MEE-301)
(REVISED CREDIT SYSTEM)

Time: 3 Hours. **[04– 08 – 08]** **MAX.MARKS: 50**

Instructions to Candidates:

- Answer **ANY FIVE** full questions.
- Assume missing data, if any, suitably.
- Use of graph sheets is **mandatory** for all plots.

1. Assuming a suitable displacement function, derive the element stiffness matrix for the beam element. (10)

2.A Evaluate the co-ordinates of the points on Hermite Cubic spline defined by the position vectors P_0= [3 5 0]^T, P_1=[9 7 0]^T and tangent vectors P_0' = [3 3 0]^T and valuate P_1' = [4 3 0]^T with $\Delta u = 0.2$ and plot the curve. (5)

2.B Clip the line defined by points A (-2.5, -1) and B (2.5, 1) using clipping window with vertices (2, 1.5), (-2, -1.5), (2, -1.5) and (-2, 1.5) using Cohen-Sutherland clipping procedure and plot the resultant line. (5)

3.A What is a register? Explain different types of registers. (4)

3.B A ruled surface is generated between a Hermite cubic spline and a Bezier curve. The cubic spline is defined by the data points P_0= [2 2 0]^T, P_1=[10 2 0]^T and tangent vectors P_0' = [3 3 0]^T, P_1' =[3 -3 0]^T. The Bezier curve is defined by the points Q_0= [3 3 -8]^T, Q_1=[8 8 -8]^T and Q_2=[12 3 -8]^T. Evaluate the points on the resultant surface at

i. u=0.2 and v = 0.4

ii. u=0.4 and v = 0.2

(6)

4.A Plot an ellipse by using parametric equation with semi major axis a=10 and semi minor axis b= 4 with center at the origin. $\Delta u=15^0$. (5)

4.B Write mid-point algorithm to generate the portion of the circle in the first quadrant with its center coinciding with the origin of the co-ordinate system. (5)

5.A Evaluate and plot the pixel positions of the line having end points (5, 9) and (9, 14) using Bresenham's line algorithm. (5)

5.B Obtain the mathematical formulation for a Hermite Bicubic surface. (5)

6.B Derive an expression for evaluating the position vector on a Bezier curve defined by 5 data points. (4)

6.B For the assemblage shown in fig. below obtain the global stiffness matrix, nodal displacements and reactions at the nodes 1 and 5. (6)