(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0400 | Roll No. | | | | | | | | | |

B. Tech.

(SEM. VII) THEORY EXAMINATION 2011-12

COMPUTER AIDED DESIGN (CAD)

Time : 3 Hours   *Total Marks : 100*

Note :– All questions are compulsory. Assume any missing data suitably.

1. Attempt any **four** parts :   (5×4=20)

    (a) Briefly discuss the functioning of CRT display.

    (b) Specify a digitizer for the CAD application and justify your choice.

    (c) Write a short note on different graphic standards used in CAD system.

    (d) What are geometric models ? Discuss different types of geometric models used in a CAD system.

    (e) With the help of a flow chart explain the 'do-while' repetition structure.

    (f) Write the output of following program with explanation :

    # include <stdio.n>

```
int main ()
{
        int i ;
        for (i = 0; i < 100; i ++)
        {
        printf("I will not do this job.");
        }
        return 0;
}
```

2. Attempt any **four** parts :   (5×4=20)

(a) Using the DDA algorithm digitise the line to be drawn from (10, 20) to (150, 125).

(b) Differentiate between the parametric and non-parametric curve forms.

(c) A square with an edge length of 10 units is located on the origin with one of the edge at an angle of 30° with the +X axis. Calculate the new position of the square if it is rotated about Z axis by an angle 30° in clockwise direction.

(d) Using the Bresenham's line drawing algorithm plot a line with end points at (10, 5) and (15, 9).

(e) What is reflection transformation ? Write the steps involve in determining reflection matrix when axis of reflection is a line $y = mx + c$.

(f) What are B-Spline curves ? State their advantages.

3. Attempt any **two** parts : (10×2=20)

(a) What is the parametric form of a curve ? Develop the parametric equation for a circle and a parabola.

(b) Generate a Bezier curve using following control points :

   (1, 0), (3, 2), (4, 1), (3, −1), (4, −2) and (5, −1).

(c) Discuss about the basic characteristics of Solid Modeling. What are the different ways of representing a solid models in a CAD system ?

4. Attempt any **two** parts : (10×2=20)

(a) Design a helical compression spring for a maximum load of 2 kN for a deflection of 50 mm for a spring index of 5. The maximum permissible shear stress for wire is 420 MPa and modulus of rigidity is 84000 N/mm².

(b) Write a C/C++ program for design of a hollow sleeve coupling.

(c) Explain following commands with respect to Auto CAD :

   (i) Extend

   (ii) Chamfer

   (iii) Mirror.

5. Attempt any **two** parts : (10×2=20)

(a) Using the method of Least Square obtain y as a linear function of x in the given data set :

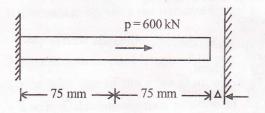| x	9	12	17	22	31
y	10	21	33	42	52

(b) Find the numerical integration of $\int_{0}^{1} \dfrac{x^2}{1 + x^3}$ using :

    (i)   Trapezoidal Rule

    (ii) Simpson's $\dfrac{1}{3}$ rule.

Divide the range into four equal parts. Also calculate error in each case.

(c) Consider the bar shown in the figure. A force of 600 kN is applied at the mid point of the bar. Determine the nodal displacements, end reactions and stress in the bar. Cross section area of the bar is 200 mm².

Take E = 2 × 10⁴ MPa and B = 1.2 mm.