Printed Pages : 3   **TME-701**

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

PAPER ID : 0400   Roll No. [ ][ ][ ][ ][ ][ ][ ][ ][ ]

B. Tech.

(SEM. VII) EXAMINATION, 2007-08
COMPUTER AIDED DESIGN (CAD)

Time : 3 Hours]   *[Total Marks : 100*

Note : **All** *questions are compulsory and carry* **equal** *marks.*

1   Attempt any **four** parts :

   (a)   Make a table of important design phases. What are the required CAD tools to support various design phases?

   (b)   Compare the capabilities, advantages and disadvantages of any three types of display devices.

   (c)   What do you understand by coordinate system of a CAD tool? Name the coordinate systems required in order to input, store and display model geometry and graphics.

   (d)   What are the two methods in which an electron beam can be bent?

   (e)   One C program has been given below :

```
main ( )
{
        int i=3;
        int *j;
        j=&i;
}
```

also given :

i	j	variable
3	6485	Content
6485	3276	Address

Find out the values of j, &i, &j, *j, *(&i).

(f) Write a C program to add first seven terms of the following series using loop control statements :

$$\frac{1}{1!} + \frac{2}{2!} + \frac{3}{3!} + \ldots\ldots$$

(g) Compare C and C++ languages.

2 Attempt any **two** parts :
(a) For the points P_1 (1,1), P_2 (3,1), P_3 (4,2), P_4 (2,3) that defines a 2-D polygon, develop a single concatenated transformation matrix that :
  (i) reflects about line $x = 0$,
  (ii) trasnslates by - 1 in both x and y direction,
  (iii) rotates about the z-axis by 180 deg.
  Using this matrix, determine the new coordinates.
(b) Explain the steps are required to draw pixel point for line drawing using Bresenham's algorithm?
(c) Draw a schematic diagram and explain the working of color monitor display device. Also explain RGB and CMY color models.

3 Attempt any **two** parts :
(a) Briefly explain :
  (i) Superquadric surfaces and
  (ii) Blobby objects.

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    (b)   Find the equation $\tilde{r}(u)$ of a Hermite cubic spline that passes through points (1,2) and (3,4) and whose tangent vectors are the two lines connecting these two points with point (2,7).

    (c)   Explain the Bezier curves and write its importance and properties. Derive a cubic Bezier curve parametric equation.

4   Attempt any **two** parts :

    (a)   Write formulae and steps for design of a hollow-shaft. Also write a computer program in C-language.

    (b)   Write 5 drawing commands and 5 editing commands in Auto-CAD.

    (c)   What do you understand by Boolean operations in CSG method of solid modeling? Explain with the help of suitable examples. Describe how union of two planes is obtained ?

5   Attempt any **two** parts :

    (a)   Describe least square error fitting of straight line $y = mx + c$ to various data for x and y and find the constants m and c.

    (b)   Find the root of the equation $\cos x = 3x - 1$ correct to three decimal places.

    (c)   Describe Trapezoidal and Simpson method of numerical integration and compare the two.

    (d)   Explain general methodology of solving a design problem using Finite Element Method. Also write the advantages of FEM.