Code: CT72   **Subject: COMPUTER GRAPHICS**

ALCCS

Time: 3 Hours   **FEBRUARY 2014**   **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:
- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**

Q.1   a. How are different shades of colour generated on the RGB monitors?

   b. Obtain a matrix for shearing an object along x-axis by L unit of length.

   c. Write the open GL commands to plot a sphere of radius 3 units and rotate it around the diameter along line x = y in x-y plane.

   d. Explain the concept related to C^2 continuity.

   e. Find the transformation matrix for rotating (x, y, z) along X-axis by an angle 30^0.

   f. What is vanishing point? Which type of projections uses vanishing point?

   g. Why hidden surfaces are removed while rendering a solid on the output screen? Write the name of two algorithms that are used to achieve this.   **(7×4)**

Q.2   a. Write an algorithm to draw a line and use the algorithm to find all pixels coordinate along the line between (1,12) and (7, 1).   **(9)**

   b. Write Scan line filling algorithm and use the algorithm to fill the inside area of the polygon bounded by (1, 1), (4, 4) and (7, 1).   **(9)**

Q.3   a. What do you mean by homogeneous coordinate system? How does it help in finding a composite matrix for different transformations applied in a sequence? Explain your answer with a suitable example.   **(9)**

   b. Using mid-point subdivision method, clip a line segment between lines (1, 1) and (8, 12) so that it can be displayed within a rectangular window bounded by (2, 1) and (12, 10).   **(9)**

Q.4   a. Calculate the open uniform knot vector for a B-spline of 8 control points and order 4. Draw the curve based on eight control points.   **(8)**

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   b. Determine the equation of Bezier curve over the interval for t=0: .01: 1 and control points are at (1, 1), (2, 1), (4, 3) and (3, 1). **(10)**

Q.5   a. What are the issues involved in 3D clipping? How is it different from 2D clipping? Describe any one algorithm to clip 3D object. **(9)**

   b. When a projection is called a cabinet projection and a cavalier projection? Determine the projection matrix for cabinet and cavalier projections. **(9)**

Q.6   a. Write the Painter's algorithm for back face detection. **(9)**

   b. Describe the Ray Tracing method of surface rendering. **(9)**

Q.7   Write a short note on any **TWO** of the followings:

    (i)   Self similar fractals.
    (ii)   Specular Reflection
    (iii) Simulating acceleration in animation   **(9+9)**