

**ALCCS – NEW SCHEME**

Code: CT72  
Time: 3 Hours

Subject: COMPUTER GRAPHICS  
Max. Marks: 100

**AUGUST 2011**

**NOTE:**

- Please write your Roll No. at the space provided on each page immediately after receiving the Question Paper.
- 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.

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- Q.1**
- a. What is rigid body transformation? Explain how it is different from affine transformation.
  - b. Define homogeneous co-ordinate system and points at infinity. Give parametric equation of the line defined between points (2, 4) and (6, -7). Can it be written in homogeneous co-ordinate system?
  - c. Find the new point obtained when a point (3, 6) is translated with  $t_x = -3$  and  $t_y = 7$ . Write the transformation matrix for the same.
  - d. What is the difference between parallel and perspective projection? Give suitable example to clarify your answer.
  - e. Frame buffer is required in graphics rendering. What is frame buffer and rendering process?
  - f. Define knot vector and explain the concept used to define a Bezier curve. Compute coefficients of Bezier curve in the interval [1,3].
  - g. Briefly explain Bresenham circle generation with a suitable example. (7×4)
- Q.2**
- a. Explain the way a LCD screen functions. How the colour is shown on the screen? (6)
  - b. Explain DDA line drawing algorithm between points (a,b) and (c, d). (6)
  - c. Explain Flood Fill algorithm for polygon filling with a suitable example. (6)
- Q.3**
- a. Find reflections of point (3, 4) with respect to a line  $y = x$  and find the corresponding transformation matrix. (6)
  - b. Determine sequence of basic transformations that are equivalent to the rotation of a point (x, y) around (1, 3). (6)

- c. Differentiate between window and view port. What technique do we use to see large size graph on a comparatively smaller screen? (6)
- Q.4** a. Clip a line segment between points (1, 3) to (5, 17) using Cohen Sutherland clipping algorithm so that it fit into view port with left bottom at (2, 5) and right top at (5, 12). (6)
- b. Find a rotation matrix to rotate the point (1, 2, 3) by  $45^\circ$  around origin in x-y plane. Find transformed value of the point also. (6)
- c. What is axonometric orthographic projection? Explain the term isometric, diametric and trimetric projection. (6)
- Q.5** a. Describe in brief the steps required to produce real time animation. (6)
- b. Define the term morphing and explain its use in key frame systems of animation. (6)
- c. Write a short note on Back-face detection method. (6)
- Q.6** a. What is surface rendering? Explain in brief the Gouraud shading method. (6)
- b. Describe Horner's rule to display curves on computer screen. (6)
- c. How to represent a solid in computer graphics using sweep representation? (6)
- Q.7** Write short notes on any **THREE** of the following:
- (i)  $C^0$  Continuity
  - (ii) Mandelbrot Fractal
  - (iii) Specular reflection
  - (iv) Painter's Algorithm
- (6+6+6)