Total No. of Questions : 10] [Total No. of Printed Pages : 4

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CS–504

B. E. (Fifth Semester) EXAMINATION, Dec., 2011

(Computer Science Engg. Branch)

COMPUTER GRAPHICS AND MULTIMEDIA

(CS – 504)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : The question paper is divided into five Units. Each Unit carries an internal choice. Attempt *one* question from each Unit. Thus attempt *five* questions in all. All questions carries equal marks. Assume suitable data whenever necessary.

Unit – I

1. (i) What would be the approximate spot size in inches of 7 in high 525 line raster scan CRT that has a total vertical over scan of 20% ? 6

   (ii) Explain the Bresenham's line algorithm for drawing a line with a slope less than 1 and greater than 0. 8

   (iii) How can the light pen differentiate between two points on the screen when both have the same colors and intensity ? 6

P. T. O.

Or

2. (i) An RGB raster system is to be designed using 8 inch by 10 inch screen with a resolution of 100 pixel per inch in each direction. If we want to store 6 bits per pixel in the frame buffer, how much storage (in bytes) do we need for the frame buffer ? 10

(ii) Differentiate between Flood Fill and Boundary Fill algorithms. Apply the stack based seed fill algorithm to fill the polygon defined by the vertices (1, 1), (1, 4), (3, 6), (8, 6) and (8, 1). The seed pixel is at (4, 3) and polygon in boundary filled. 10

Unit – II

3. (i) Clip line with end points (0, 0) and (12, 12) using Cohen Sutherland algorithm. The clipping rectangle is defined with bottom left edge as (1, 1) and top right edge as (10, 10). 10

(ii) Show that two-dimensional scale and rotation do not commute that is, scaling followed by rotation is not equivalent to rotation followed by scaling. 10

Or

4. (i) Consider the clipping window with diagonally opposite edges (1, – 1) and (– 1, 1). Using Cohen Sutherland line clipping algorithm. slip the line with end points (– 3/2, – 1) and (3/2, 2). Explain with a figure also. 10

(ii) Derive a general 2D-tranformation matrix for rotation about the origin. Perform a 45° rotation of a square having vertices A (0, 0), B (0, 2), C (2, 2), D (2, 0) about the origin. 10

Unit – III

5. (i) Explain the Z-buffer algorithm for creating 3D illusion on 2D screen. 8

(ii) Draw a rough sketch of Bezier curve with the following control points : P1 (60, 30), P2 (0, 30), P3 (80, 25), P4 (80, 0). 6

(iii) Write the properties of B-Spline. Show that B-Spline curve is non-uniform and periodic. 6

Or

6. (i) Find the standard perspective projection of a line joining points A(– 1, 1, – 2) to B (2, – 2, 0) when centre of projection at (0, 0, – 4). 10

(ii) It is desired to rotate object clockwise through 30-degree about an axis passing through the origin and the point P (10, 10, 0). What are the sequences of transformation matrices that must be used to carry out the desired rotation ? 10

Unit – IV

7. (i) What is the necessity of a color model ? Explain the following color models with necessary equations and applications : 10

(a) RGB

(b) CMY and CMYK

(ii) Find the matrix for mirror reflection with respect to the plane passing through the origin and having the normal vector whose direction is : 10

$$N = i + j + k$$

Or

8. (i) Reflect the diamond-shaped polygon whose vertices are A (− 1, 0), B (0, − 2), C (0, 1) and D (0, 2) about the : 12

   (a) Horizontal line Y = 2

   (b) Vertical line X = 2

   (c) Line Y = X + 2

   (ii) Describe Phong shading model. How is it more accurate than Gourand shading model ? 8

Unit – V

9. (i) What are the steps involved in image preparation used in JPEG image compression ? Explain them with the help of a diagram. 10

   (ii) Describe how sound is represented in computer memory and explain different audio formats available. 10

Or

10. (i) Describe the data stream characteristics of continuous data like audio and video data streams with examples. 10

    (ii) Explain about MPEG Audio Encoder and Decoder with a neat diagram. 10

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