

Code: DC09
Time: 3 Hours

JUNE 2011

Subject: COMPUTER GRAPHICS
Max. Marks: 100

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 Minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2×10)

- a. The resolution of a 2×2 inch image that has 512×512 pixels is
- (A) 128 pixels per inch (B) 512 pixels per inch
(C) 1024 pixels per inch (D) 256 pixels per inch
- b. Light pen is a
- (A) Input device (B) Output device
(C) Memory device (D) Plotting device
- c. To move the image or object from one position to another is called as _____.
- (A) Scaline (B) Rotation
(C) Translation (D) Skewing
- d. A line with starting points as (2, 3) and ending point (6, 18) is given. The slope of line is
- (A) 2 (B) 4
(C) 5 (D) 3
- e. The matrix for rotation clockwise direction is
- (A) $\begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix}$ (B) $\begin{bmatrix} \cos \theta & \sin \theta \\ \sin \theta & \cos \theta \end{bmatrix}$
(C) $\begin{bmatrix} \cos \theta & -\cos \theta \\ \sin \theta & \sin \theta \end{bmatrix}$ (D) $\begin{bmatrix} \cos \theta & \sin \theta \\ -\cos \theta & \sin \theta \end{bmatrix}$
- f. There could be maximum of _____ vanishing points along the three orthogonal axes.
- (A) 2 (B) 4
(C) 5 (D) 3

- g. Short term for picture element is called as _____
- (A) Buffer (B) Vector
(C) Pixel (D) Graphic
- h. The method for selecting and enlarging portions of a drawing is called _____
- (A) windowing. (B) clipping.
(C) viewport. (D) none.
- i. DDA stands for
- (A) Digital Decision Analysis (B) Decision Divide Analysis
(C) Digital Differential Analysis (D) Digital Differential Analyzer
- j. If the line is entirely within the window then both points will have out codes
- (A) 1111 (B) 1000
(C) 0000 (D) 1011

**Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.**

- Q.2** a. How computer graphics is used in CAD of architecture, mechanical and aeronautical? (6)
- b. What is the principle of polarize light? How it is used in LCD? (10)
- Q.3** a. Explain the following input devices:
- (i) Light pens
(ii) Joy sticks
(iii) Image scanner (9)
- b. Write a DDA line algorithm for representing a line in third quadrant. (7)
- Q.4** a. Describe rubber band methods and dragging. (7)
- b. Write Bresenham's circle drawing algorithm. (9)
- Q.5** a. Find the normalization transformation that maps a window lower left corner is at (1, 1) and upper right corner is at (3, 5) on to
- (i) viewport that is the entire normalized device screen and
(ii) a viewport that has lower left corner at (0, 0) and upper right corner. (8)
- b. Describe Cohen-Sutherland line clipping algorithm. (8)
- Q.6** a. Explain generation of bar charts and pie charts. (8)

- b. Find the matrix for mirror reflection with respect to the plane passing through the origin and having a normal vector whose direction is $N=I+J+K$. (8)
- Q.7** a. Using the origin as the centre of projection derive the perspective transformation onto the plane passing through the point $R_0(x_0, y_0, z_0)$ and having the normal vector $N = n_1I + n_2J + n_3K$. (8)
- b. Explain Z-buffer algorithm. What are advantages and disadvantages of Z-buffer algorithm? (8)
- Q.8** a. Write brief note on Octree representation (8)
- b. Explain phong specular reflection illumination model. (8)
- Q.9** a. What are the various hardware requirements of multimedia components and explain it. (8)
- b. Write short note on the following:
- (i) Windows Paint Brush
 - (ii) CRT (4×2)