

Code:1825

Roll No.:

M.Sc.(INFORMATICS) II Sem-2018

Paper IT-25- Computer Graphics & Multimedia

Time: 3hrs

Max.Marks:75

Write your Roll No. on the top immediately on receipt of this question paper

**Attempt five questions in all
Question No.1 is compulsory**

- Q.1** (a) Explain how an image is displayed on a monitor screen using beam of electrons.
(b) Explain the functions of horizontal and vertical deflection coils inside a CRT.
(c) Explain what is meant by the statement : " The refresh rate of a monitor is $70Hz$ ".
(d) What is monitor resolution ? How should the displayed image quality change if resolution is changed?
(e) What is polarized light and a polarizing filter? How are these utilized within an LCD monitor?

(5 × 3 = 15)

Q.2 (a) A 15-inch monitor with an aspect ratio of 4 : 3 has a pixel addressability of 800×600 . Calculate its resolution and dot-pitch. (3)

- (b) Describe the Digital Differential Analyzer (DDA) algorithm for drawing a line . What are the problems associated with this algorithm? (3)
(c) Describe the Bresenham's algorithm for drawing a line . Rasterize the line with end points (20, 10) and (30, 18). (9)

Q.3(a) Describe Bresenham's algorithm for drawing a circle. Draw a circle with center (0, 0) and radius 5 using midpoint circle algorithm. (6)

- (b) Consider the line AB such that the position vector of the end points are $[A] = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$, $[B] = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$. Find the result of the transformation

$$[T] = \begin{bmatrix} 1 & 2 \\ 3 & 1 \end{bmatrix}$$

Show that the mid point of the new line A^*B^* is same as when transformation acts on the mid point of the untransformed line AB . (6)

(c) Consider two intersecting lines AB and EF with end points $[A] = [-1 \quad -1]$, $[B] = [3 \quad 5/3]$ and $[E] = [-1/2 \quad 3/2]$, $[F] = [3 \quad -2]$. Using the transformation

$$[T] = \begin{bmatrix} 1 & 2 \\ 1 & -3 \end{bmatrix}$$

, find the intersection point of the untransformed lines. Show that it is identical to the intersection point of the transformed lines. (3)

Q.4(a) Deduce the various steps involved in the reflection of a triangle $A(3, 2)$, $B(6, 3)$ and $C(3, 4)$ about an arbitrary line $y = 3x + 5$. (6)

(b) What is the need of homogeneous coordinates? Suppose the center of an object is at $[4 \quad 3]$ and a point in it has the coordinate $[x \quad y]$. What will be their values if it is desired to rotate the object 90° counter-clockwise about its center. (4)

(c) Explain the window - to - viewport mapping. How do you go about line clipping using the Cohen-Sutherland algorithm. (5)

Q.5(a) A block $ABCDEFGH$ has the position vectors

$$[X] = \begin{bmatrix} 1 & 0 & -1 & 1 \\ 2 & 0 & -1 & 1 \\ 2 & 1 & -1 & 1 \\ 1 & 1 & -1 & 1 \\ 1 & 0 & -2 & 1 \\ 2 & 0 & -2 & 1 \\ 2 & 1 & -2 & 1 \\ 1 & 1 & -2 & 1 \end{bmatrix}$$

Write the transformation matrix for reflection through the xy -plane. Find the new position vectors after reflection. (6)

(b) Find the effect of a translation in the x, y, z directions by $-1, -1, -1$, respectively, followed successively by a $+30^\circ$ rotation about the x -axis, and a $+45^\circ$ rotation about the y -axis on the homogeneous coordinate position vector $[3 \quad 2 \quad 1 \quad 1]$. (6)

(c) How does multimedia technology could be used in (i) education, (ii) Electronic Commerce? (3)

Q.6 (a) Explain how unformatted text is represented internally via the ASCII table.

(b) Differentiate between formatted and unformatted text.

- (c) Distinguish between font size and font style.
- (d) What is an image? Distinguish between binary , grayscale , and color images.
- (e) How does scan quality depend on color depth supported by a scanner.

(5 × 3)