

MASTER OF COMPUTER APPLICATION
Fifth Semester
COMPUTER GRAPHICS
(MCA - 21)

Duration: 3Hrs.

Full Marks: 70

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

Answer any four from Question no. 2 to 8
Question no. 1 is compulsory.

1. What is computer graphics? Write down five different applications of it. Explain the components of computer graphics along with a diagram. (2+5+3=10)
2. Write a circle generating algorithm with radius X and center position (P Q). Plot a circle by Bresenham's algorithm whose radius is 3 and center position is (0,0). (10)
3. What are the features of inkjet printer? Write down the working principle of a digitizer. With help of a neat diagram, explain the architecture of a raster display. (3+3+4=10)
4. What are different types of polygons? Explain various approaches used to represent polygons. Explain Boundary Fill algorithm in details. (2+4+4=10)
5. (i) How many types of basic transformations available in 2D? Explain each along with their matrix representations.
(ii) What do you mean by homogeneous coordinate system? Why are homogeneous coordinates used for transformation computations in computer graphics? Explain with example. (5+5=10)
6. (i) What do you mean by 3D transformation? How do we represent a point in 3D?

(ii) For the given matrix

$$\begin{pmatrix} 2 & 0 & 1 & 0 \\ 1 & 3 & 0 & 0 \\ 4 & 0 & 1 & 0 \\ 0 & 3 & 6 & 1 \end{pmatrix}$$

First apply a rotation of 45° about the Y-axis followed by a rotation of 45° about X axis.

(1+2+7=10)

7. Perform a 45° rotation(2D) of a triangle A(0,0), B(1,1) and C(5,2) (5+5=10)

a. About the origin

b. About the point (-1,-1)

8. (i) What do you mean by Projection? Explain different categories of projection.

(ii) Explain Painter's algorithm in details.

(1+4+5=10)

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Duration: 20 minutes

Marks – 20

(PART A - Objective Type)

I. Choose the correct answer:

1×10=10

1. The phenomena of continuous glow of beam on the screen even after it is removed is known as
 - a. Fluorescence
 - b. Persistence
 - c. Phosphorescence
 - d. Incidence
2. Point out which hidden surface removal algorithm does not employ image space approach
 - a. Back face removal
 - b. Z buffer method
 - c. Scan line method
 - d. Depth sort method
3. Major components of CRT are
 - a. Electron Gun
 - b. Phosphorous coated screen
 - c. Control electrodes
 - d. All of the above
4. Back face is an example of
 - a. Object space method
 - b. Image SP method
 - c. Combination of both
 - d. None
5. Which of the following device has a relative origin?
 - a. Joystick
 - b. Trackball
 - c. Mouse
 - d. None
6. In Cohen Sutherland line clipping Algorithm, a line is already clipped if the _____
 - a. Codes of the endpoints are same.
 - b. Logical AND of the endpoint code is not 0000.
 - c. Logical OR of the endpoint code is 0000.
 - d. A & B

7. The sub categories of orthographic projection are
 - a. Cavalier, cabinet, isometric
 - b. Cavalier, cabinet
 - c. Isometric, diametric, trimetric
 - d. None of the above
8. Shadow mask method is usually used in
 - a. LCD
 - b. Raster Scan Display
 - c. Random Scan Display
 - d. DVST
9. (2, 4) is a point on a circle that has center at the origin. Which of the following points are / is also on the circle?
 - a. (2, -4)
 - b. (-2, 4)
 - c. (-4, -2)
 - d. All of the above
10. The region code of a point is 1001 the point is in the _____ region of the window
 - a. Top right
 - b. Top left
 - c. Bottom left
 - d. Bottom right

II. Fill in the blanks:

1×5=5

1. _____ is the ratio horizontal points to vertical points necessary to produce equal length lines in both directions.
2. The transformation in which the dimension of an object is changed relative to a specified fixed point is called _____.
3. The rectangle portion of the interface window that defines where the image will actually appear are called _____.
4. The _____ algorithm divides a 2D space into 9 regions of which only the middle part is visible.
5. Oblique projection with an angle of 45 degree to the horizontal plane is called as _____.

III. State true or false:

1×5=5

1. Coordinates of the viewport are known as world coordinates.
2. Control electrode is used to regulate the flow of electrons in CRT.
3. Examples of presentation graphics are bar charts and line graphs.
4. Seed pixel is considered in case of a mid-point circle algorithm.
5. Every display file contains some contiguous blocks known as segments.
