

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SIXTH SEMESTER EXAMINATION, MAY 2025

THIRD YEAR [BATCH 2022-25]

COMPUTER SCIENCE [Honours]

Date : 07/05/2025

Time : 11 am – 1 pm

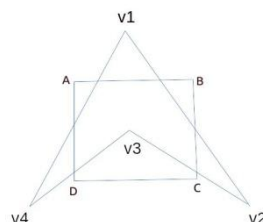
Paper : CC 14

Full Marks : 50

Answer **any five** of the following questions:

[5×10]

1. a) What is the difference between low persistence and high persistence phosphor ? Explain with their applications.
b) What do you mean by Pixel?
c) What is the difference between graphics and image processing ?
d) What is the fraction of the total refresh time per frame spent in retrace of the electron beam for a noninterlaced raster system with a resolution of 1280 by 1024, a refresh rate of 60 Hz, a horizontal retrace time of 5 microseconds, and a vertical retrace time of 500 microseconds? [2.5+2+2.5+3]
2. a) Using mid-point circle drawing algorithm evaluate the pixel positions to draw the circle arc in fourth quadrant from $x=0$ to $x=y$ of the circle with radius 10 and center at (2, 2).
b) "One point in interior region identified by one rule can be in exterior region identified by another rule within same object". State whether this statement is true or false. Justify your answer.
c) What is shearing and its inverse? [5+3+2]
3. a) What would be the new location of the corner points (2,4) and (6,8) of a square, after applying x-direction shear with $sh_x = 1/2$, relative to the line $y = -2$?
b) Find out the Final location of the point (50,50) after rotating anticlockwise 60° with respect to the point (10,10). [5+5]
4. a) In three dimensional transformation, explain the necessary steps to find out the composite transformation matrix to align a line passing through P(a1, b1, c1) and Q(a2, b2, c2) (not parallel to any co-ordinate axis) in ZX- plane.
b) What would be the final position of the point P(-1, 5, 10) after taking reflection with respect to XY-plane. Explain the necessary steps. [7+3]
5. a) Prove that the Bezier curve always passes through the first and last control points.
b) Explain with proper example- Bresenham's scan conversion Algorithm.
c) What do you mean by Morphing? Explain with an example. [2.5+6+1.5]
6. a) Find out the perspective projection of a point P(10, 8, 2) on the plane $z = 8$, where the projection reference point is (0,0,14).
b) What is Projection. classify it.
c) Show that two successive reflections about either of the coordinates axes is equivalent to a single rotation about the coordinate origin. [3+(1+2)+4]
7. a) Using Sutherland-Hodgman polygon clipping algorithm, find out the clipped region from the polygon V1V2V3V4 with respect to the viewing window ABCD given as following.



Show all the necessary steps.

- b) How 2-D line clipping can be done using Cohen Sutherland Algorithm?

[7+3]