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(b) For a given triangle of coordinates A (10, 30), B (30, 30). C (20, 15) find the following : (CO5)

(i) Reflection about X-axis

(ii) Scaling about point A

(c) Explain Bresenham circle drawing algorithm. Why is circle divided in octants in circle drawing algorithms ? (CO1)

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**M. C. A. (FOURTH SEMESTER)
END SEMESTER**

EXAMINATION, May, 2023

GRAPHICS AND VISUAL COMPUTING

Time : Three Hours

Maximum Marks : 100

Note : (i) Each question has three parts (a, b, c).
(ii) Attempt any *two* parts of each question.

(iii) All questions carry equal marks.

1. (a) Digitize the pixel points using DDA algorithm for a line segment A (20, 12), B (31, 19) using DDA line drawing algorithms. (CO1)

(b) Write short notes on any *two* the following : (CO3)

(i) Shearing Transformation

(ii) Oblique Projection

(iii) Principle of Animation

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- (c) What is inside-outside test ? Explain odd-even parity and winding number rule for checking if a point is inside or outside a given area. (CO2)
2. (a) What are convex and concave polygons ? Describe the Sutherland-Hodgeman polygon clipping algorithm. (CO2)
- (b) Consider two raster systems with the resolutions of 640×480 , 1280×1024 . What size frame buffer (in kB) is needed for each of these systems to store 12 bits/pixel, if 10 seconds video with 30 fps is loaded. (CO1)
- (c) Briefly explain the Cohen-Sutherland line clipping algorithm. (CO2)
3. (a) Explain parallel projection. How is perspective projection different from parallel projection ? What is the importance of vanishing point in projection ? (CO4)

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- (b) Calculate the coordinates of a given unit cube having a point A, at center (0, 0, 0) rotated about z-axis by 90 degree anticlockwise. Show the transformation of the rotated cube. (CO3)
- (c) What do you understand by back face detection ? Explain Z-buffer algorithm. (CO4)
4. (a) Derive Bresenham line algorithm ? What are the limitations of Bresenham algorithm ? (CO1)
- (b) Explain 4-connected and 8-connected model for filling. Explain boundary fill algorithm. (CO2)
- (c) Explain the working of LCD and LED. How is raster scan different from random scan ? (CO1)
5. (a) What is ROTATIONAL transformation ? Rotate a line AB, A(50, 50) and B (100, 150) by an angle 90 degree with respect to mid point of the line. (CO3)

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