B. Tech Odd Semester Examination, February, 2023

Computer Science & Engineering

(5th Semester)

Course No.: CSE-505(12)

(Computer Graphics)

Full Marks: 50

Pass Marks: 25

Time: 2 hours

Note:
1. Attempt any five questions.
2. Begin each answer in a new page.
3. Answer parts of a question at a place.
4. Assume reasonable data wherever required.
5. The figures in the right margin indicate full marks for the question.
6. All the mathematical symbols and abbreviations have their usual meanings.

1. (a) Explain working of Video controller. 5

   (b) Write a short note on working of raster scan display system and random scandisplay system. 4

   (c) What is pixel phasing? 1

2. (a) Consider the line from (5, 5) to (13, 9). Use the Bresenham's algorithm torasterize the line. 4

   (b) Given the center point coordinates (10, 10) and radius as 10, generate **all the points** to form a circle with Bresenham's circle drawing algorithm. 5

   (c) Mention a disadvantage of Bresenham Circle Drawing Algorithm. 1

3. (a) Derive the Mid-point Ellipse drawing algorithm 8

(b) Distinguish between convex and concave polygons with proper examples. 2

4. (a) Explain flood fill algorithm with pseudo-code. Also mention itslimitations, if any. 5

(b) Explain 2D transformation with its types. 5

5. (a) What is homogeneous co-ordinate? Why is it required? 2

(b) Consider a square A (1, 0), B (0, 0), C (0, 1), D (1, 1). Rotate the square by 45°anti-clockwise direction followed by reflection about X-axis. 4

(c) Derive the matrix representation for 2-D rotation. 4

6. (a) A unit square is transformed by a 2 x 2 transformation matrix. The resulting position vectors are:

0 2 8 6
0 3 4 1

What is the transformation matrix? 5

(b) Given a triangle with corner coordinates (0, 0), (1, 0) and (1, 1). Rotate the triangle by 90 degree anticlockwise direction and find out the new coordinates. 5

7. (a) Use the Cohen Sutherland algorithm to clip two lines

P1(35, 10), – P2 (62, 40) and P3 (65, 20) – P4 (95, 10) against a window A(50, 10), B(80,10), C(80, 40), D(50,40). 5

(b) Explain inside and outside tests for polygon. 5

8. (a) Explain the procedure to generate Bezier curve. 5

(b) Write DDA Arc generation algorithm. 4

(c) Explain the need of homogeneous co-ordinates matrix. 1

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