

Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.

[Total No. of Questions: 09]

[Total No. of Pages: 02]

Uni. Roll No. ....

Program: B.Tech. (Batch 2018 onward)

Semester: 6<sup>th</sup>

Name of Subject: Computer Graphics

Subject Code: PCCS-113

Paper ID: 17189

Scientific calculator is Not Allowed

EVENING

19 JAN 2023

Time Allowed: 03 Hours

Max. Marks: 60

**NOTE:**

- 1) Parts A and B are compulsory
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
- 3) Any missing data may be assumed appropriately

[Marks: 02 each]

**Part – A**

**Q1.**

- a) What do you understand by emissive and non-emissive displays?
- b) List down the steps associated with DDA line drawing algorithm?
- c) How does the Cohen-Sutherland algorithm classify lines for clipping purposes?
- d) Distinguish between Window and Viewport.
- e) Justify the use of data glove and digitizer in computer graphics applications.
- f) Compare Gouraud shading and phong shading.

[Marks: 04 each]

**Part – B**

**Q2.** Compare boundary fill and flood fill algorithm of area filling. How does the problem of stack overflow be handled in these algorithms.

**Q3.** Define the following terms with suitable examples:

- a) Fractals
- b) Ray Tracing

**Q4.** Consider three different raster systems with resolution of

- a)  $640 \times 480$
- b)  $1280 \times 1024$
- c)  $2560 \times 2048$

What size of frame buffer (in bytes) is needed for each of these systems to store 12 bits/pixel? How much storage is required for each system if 24 bits per pixel are to be stored?

- Q5. Discuss various anomalies associated with perspective projections.
- Q6. Distinguish among CRT and LCD.
- Q7. Construct the pixel locations of a circle by Midpoint algorithm whose radius is 5 and centred at origin.

**Part – C****[Marks: 12 each]**

- Q8. Explain the Bresenham's line drawing algorithm with derivations in detail. Identify the coordinates of the pixels that lie on line segment having endpoints (20,10) and (30,18) using Bresenham's line drawing algorithm.

OR

Illustrate 2D geometric transformations with suitable examples. A polygon coordinates are A (7,3), B (9,3), C (9,5) and D (7,5). A uniform scaling with a scaling factor of 2 and reflection through origin and translation by 1 unit in both directions on a polygon have been applied one after the other. Identify the original coordinates of the polygon.

- Q9. Explain Liang-Barsky 2D line clipping algorithm in detail. Criticize “why this algorithm is more efficient than the Cohen-Sutherland line clipping algorithm?”

OR

Categorize various visible surface detection algorithms. Elaborate depth buffer algorithm and compare it with other methods for visible surface detection.

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