[Total No. of Questions: 09]　　　　　　　[Total No. of Pages: 02]

Uni. Roll No. ....

Program: B.Tech. (Batch 2018 onward)

Semester: 6th　　　　　　　　　　　　　　EVENING

Name of Subject: Computer Graphics

Subject Code: PCCS-113　　　　　　　　13 JUN 2023

Paper ID: 17189

Scientific calculator is Not Allowed

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

Part – A　　　　　　　　　　　　　　[Marks: 02 each]

Q1.

a) Compare beam penetration method with shadow mask method of CRT.

b) How Bresenham's line algorithm is better than DDA line drawing algorithm.

c) Find the matrix representation for 3D rotation about y-axis.

d) List down the side effects of scan conversion. How they can be eliminated?

e) Determine the time spent during scanning across each row of pixels during screen refresh on a raster system with a resolution of 1280 x 1024 and a refresh rate of 60 frames/second?

f) Explain briefly any two methods to overcome the problem of clipping concave polygons.

Part – B　　　　　　　　　　　　　　[Marks: 04 each]

Q2. How surface rendering is important in display of objects? Explain basic ray tracing algorithm in detail.

Q3. Explain the process of window to viewport mapping in 2D transformations.

Q4. A rectangular parallelopiped has unit distance along z-axis, distance 3 units along x-axis and a distance of 2 units along y-axis. Show the effect of scaling on it with scaling factors $S_x = 1/3$, $S_y = 1/2$ and $S_z = 1$.

Q5. Design the architecture of a raster scan display using a neat block diagram.

Q6. Distinguish between boundary fill and flood fill algorithm.

Q7. Discuss the Cohen-Sutherland line clipping algorithm with suitable example.

Part – C   **[Marks: 12 each]**

Q8. What is the use of projections in computer graphics? Illustrate the taxonomy of projections. Explain the applications and anomalies associated with projections.

OR

How can we classify visible surface detection in computer graphics? Demonstrate and compare any four visible surface detection algorithms in detail.

Q9. Derive the decision parameters expressions for midpoint circle drawing algorithm. Make use of midpoint circle drawing algorithm to determine the coordinates of the pixels that lie on the boundary of circle with radius 10 and centred at (100, 100).

OR

Explain various 2D- geometric transformations along with their matrix representations. If a triangle is defined by A (2,2), B (4,2) and C (4,4). Determine the transformed coordinates after the following transformations:

a) 90° rotation about origin.

b) reflection about a line y = -x.

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