Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes. 05 OCT 2023

[Total No. of Questions: 09]
Uni. Roll No. ....

[Total No. of Pages: 02]

Program: B.Tech. (Batch 2018 onward)
Semester:. 5th
Name of Subject: **Computer Graphics**
Subject Code: **PCCS-113**
Paper ID: **17189**
Scientific calculator is NotAllowed

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) Differentiate between raster scan systems and random scan systems?
b) Discuss the advantages and disadvantages of DDA algorithm.
c) How visible surface detection algorithms are classified in computer graphics?
d) How diffuse reflection differs from specular reflection? Discuss.
e) What is the role of frame buffer in raster method?
f) Define tilting as a rotation about x axis followed by a rotation about the y axis in 3-d. Does the order of performing the rotation matter? Justify your answer.

Part – B

[Marks: 04 each]

Q2. What is the importance of projections in computer graphics? Discuss different types of projections for the display of real objects on display device screen.

Q3. Explain the basic operation of a CRT monitor, including how it produces images and the role of the cathode ray tube itself. What are the main advantages and disadvantages of CRT technology compared to modern display technologies like LCD and LED?

Q4. Compare and contrast the Boundary Fill algorithm and the Flood Fill algorithm.

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P.T.O.

Q5. Explain the concept of homogeneous coordinates and their significance in 2D transformations. How do homogeneous coordinates simplify operations like translation, rotation, scaling, and shearing compared to using regular Cartesian coordinates?

Q6. What is the need of polygon clipping in computer graphics? Describe the shortcomings of Sutherland-Hodgeman polygon clipping algorithm.

Q7. How surface rendering is important for the display of objects? Discuss and compare Gouraud and Phong shading techniques for surface rendering

Part – C [Marks: 12 each]

Q8. Describe scan line algorithm and Depth buffer method to display the visible surfaces in a scene containing several polyhedrons.

OR

Explain the core principles of the Liang-Barsky line clipping algorithm and how it works to determine whether a line segment lies completely within a given clipping window. Find out the visible portion of two lines $P1(-1,7)$- $P2(11,1)$ and $P3(3,10)$-$P4(3,7)$ against a window whose left-hand corner is at $L(1,2)$ and Right-hand corner is at $R(9,8)$

Q9. Derive decision parameters for the Midpoint circle drawing algorithm assuming (h, k) as center and r as a radius of circle. Using midpoint circle drawing algorithm, to find the coordinates of pixels that lie on the boundary of circle with radius 5 and center at $(3,2)$.

OR

Reflect the diamond shaped polygon whose vertices are $A(-1,0)$, $B(0,-2)$, $C(1,0)$ and $D(0,2)$ about

    i) the horizontal line $y = 3$

    ii) the vertical line $x = 4$

    iii) the line $y = x + 4$

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