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Total Number of Pages : 02

B.Tech
RCS5D006

5th Semester Reg/Back Examination: 2024-25

Computer Graphics

CST, CSEDS, CSE, CSIT, CSEAIME, IT

Time : 3 Hour

Max Marks : 100

Q. Code : R264

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 Answer the following questions:

(2 x 10)

- a) Define computer graphics.
- b) What is the midpoint algorithm for circle generation?
- c) Mention one advantage of random scan systems over raster scan systems.
- d) What are graphics standards? Give an example.
- e) How does character size affect character rendering?
- f) Why is the order of transformations important in composite transformations?
- g) What is the difference between diffuse reflection and specular reflection?
- h) What is a mesh in 3D graphics?
- i) What is the role of the viewing coordinate system in 3D viewing?
- j) Define back-face detection.

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- a) Explain the working of any three graphics input devices, such as a light pen, joystick, and graphics tablet.
- b) Compare and contrast CRT and LCD display devices.
- c) Write the algorithm for drawing an ellipse and explain its working.
- d) How are characters represented and rendered in computer graphics? Discuss the significance of fonts and styles.
- e) Derive the matrix for reflection about the line $y = mx + c$.
- f) Explain why the order of transformations matters in composite transformations. Support your answer with an example.
- g) Differentiate between Bézier curves and B-spline curves.
- h) Differentiate between parallel and perspective projection in 3D viewing.
- i) What is the window-to-viewport transformation? Derive the formula and explain its significance.
- j) Explain the concept of clipping in computer graphics. Why is it necessary?

- k) Define ambient illumination and explain its role in rendering 3D scenes.
- l) Explain the depth buffer method for visible surface detection. How does it work to resolve visibility issues?

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3** Compare the DDA and Bresenham's algorithms for line generation. Discuss their advantages and limitations. **(16)**
- Q4** Discuss the Cohen-Sutherland line clipping algorithm in detail. Explain all the region codes, bitwise operations, and decision-making processes involved. Provide a comprehensive example with a diagram. **(16)**
- Q5** Explain the concepts of parallel and perspective projections in 3D graphics. Derive the projection transformation matrices for both, and provide examples of their applications. **(16)**
- Q6** Explain the XYZ color model in detail. How does it relate to other color models like RGB and CMY? Discuss its applications in color management systems, including its use in monitors and printers. **(16)**