R18

Code No: 155AM

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, January - 2025

COMPUTER GRAPHICS

(Common to CSE, IT, CSIT, CSE(AI&ML), CSE(DS))

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	What is the main challenge when using the flood-fill algorithm?	[2]
b)	How is a random-scan system different from a raster-scan system?	[3]
c)	How viewing coordinate system is different from world coordinates in 2D graphics?	[2]
d)	How are composite transformations performed in 2D geometry?	[3]
e)	How are B-spline surfaces different from Bézier surfaces?	[2]
f)	What is the general equation of a sphere as a quadric surface?	[3]
g)	What is the role of shear transformations in 3D graphics?	[2]
h)	Explain the difference between "viewing" and "rendering" in the context of 3D graphics.	[3]
i)	Write the limitations of raster-based animation systems.	[2]
j)	What is the role of the Z-buffer in the depth-buffer method for visible surface detection?	[3]

PART – B

(50 Marks)

2.a)	Write an algorithm of mid-point ellipse.	
b)	How does a light pen work, and what advantages does it offer over a traditional mouse?	[4+6]

OR

3.a)	Describe about the Liquid Crystal display device.	
b)	Explain the Scan line polygon filling algorithm.	[5+5]
4.a)	How does a rotation transformation work in 2D? Describe how it is represented mathematically.	
b)	Find the normalization transformation window to viewport, with window, lower left corner at (1,1) and upper right corner at (3,5) onto a viewport with lower left corner at (0,0) and upper right corner at (0.5,0.5).	[4+6]

OR

5.a)	Explain about the two dimensional viewing transformation.	
b)	Find out the co-ordinates of a figure bounded by (0,0), (1,5), (6,3), (-3,-4) when reflected along the line whose equation is y=2x+4 and sheared by 2 units in x direction and 2 units in y direction.	[4+6]

6.a) Derive the transformation matrix for B-spline surface.

b) What is ambient light, and how does it affect the overall appearance of a scene in computer graphics? [4+6]

OR

7.a) What is polygon rendering? Explain about the Constant Intensity Shading method.

b) Derive the transformation matrix for Hermite curve. [6+4]

8.a) Describe about the 3D composite transformation.

b) What are the main differences between parallel projection and perspective projection in terms of visual representation? [4+6]

OR

9. Derive the 3D viewing transformation matrix. [10]

10.a) Explain about the back-face detection in visible surface determination.

b) Describe the concept of keyframe systems in computer animation. [5+5]

OR

11.a) Describe the steps involved in the BSP-tree method for visible surface determination.

b) Explain the main types of computer animation languages? Provide examples of each. [5+5]

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