

(i) Printed Pages : 3

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(ii) Questions : 9

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M.Sc. Information Technology 3rd Semester

(2122)

COMPUTER GRAPHICS

Paper : MS-39

Time Allowed : Three Hours]

[Maximum Marks : 80

Note :— Attempt five questions in all, including Question 9 in Section-E, which is compulsory and taking one each from Section-A to Section-D.

SECTION—A

1. (a) How does a raster scan system work ? How is it different from random scan systems ?
- (b) A raster system has a resolution of 640-by-480. How many pixels could be accessed per second in this system by a display controller that refreshes the screen at 60Hz ? 8,8
2. How does Bresenham's straight-line algorithm differ from the DDA ? What efficiencies are achieved by this difference ? You may use a diagram to aid your answer. Using Bresenham's algorithm, draw a line from (20,20) to (100,10). 16

SECTION—B

3. Define the terms window, viewport, clipping and viewing transformation in your own words, and indicate with sketches the process of applying viewing transformation to a 2D scene. Derive a window-to-viewport transformation for rectangular shapes. 16
4. (a) What are the various 2-dimensional transformations? Explain with the help of suitable sketches. Give their matrix representations.
- (b) Explain the working of the Liang-Barsky algorithm for line clipping with the help of suitable example. 8,8

SECTION—C

5. What is animation? Explain the C/C++ graphics programming features to develop animated algorithm for Towers of Hanoi. 16
6. Write short notes on :
 - (a) Mouse Programming
 - (b) OpenGL for color, lighting and animation. 8,8

SECTION—D

7. (a) What is a three-dimensional display? Give the mathematical description of Perspective projection by taking suitable example.
- (b) What is back-face elimination for hidden surface removal? Describe how it works in principle. 8,8

8. (a) What are the differences between flat shading, gouraud shading and phong shading of polygons ?
- (b) Explain the importance of B-Spline Curves in Computer Graphics. 8,8

SECTION—E

(Compulsory Question)

9. (a) Differentiate between inking and panning as interactive graphical techniques with examples.
- (b) What are Homogeneous co-ordinates ? Explain its significance with examples.
- (c) How do we load graphics images from disk ? Explain the algorithm.
- (d) Give the transformation steps for obtaining a composite matrix for rotation about an arbitrary axis with the rotation axis projected on to the z axis. 4,4,4,4