SYIT/SEM IV/REG/COMPUTER GRAPHICS AND ANIMATION

Time: 2½ hrs. **Marks:75**

Note:
1. All questions are compulsory with internal choice.
2. Draw neat diagrams wherever necessary.
3. Figures to the right indicate full marks.

Q.1 Answer the following (any three) **(15)**

(a) Justify the difference between Raster Scan and Random Scan Display.
(b) Describe DVST (Direct View Storage Tube) Display with a diagram and its working.
(c) Calculate the intermediate points between A(5,6) and B(8,12) using the DDA Algorithm.
(d) Calculate the intermediate points between the starting coordinates (9,18) and ending coordinates (14,22) using Bresenham's Line Drawing Algorithm.
(e) Justify the CRT (Cathode Ray Tube) Display with a diagram and its working.
(f) Define Computer Graphics and list four applications.

Q.2 Answer the following (any three) **(15)**

(a) Given a 2D triangle with coordinates A(0,3), B(3,3), and C(3,0), apply a translation of 5 units along the X-axis and 4 units along the Y-axis. Determine the new coordinates $(\bar{x}, \bar{y})$ of the triangle.
(b) Given a 2D square with coordinates A(0,3), B(3,3), C(3,0), and D(0,0), apply a scaling factor of 2 along the X-axis and 3 along the Y-axis. Determine the new coordinates $(\bar{x}, \bar{y})$ of the square.
(c) Given a 2D triangle with coordinates A(3,4), B(6,4), and C(5,6), apply a reflection about the X-axis. Determine the new coordinates $(\bar{x}, \bar{y})$ of the triangle.
(d) Given a 3D rectangle with coordinates A(6,7,8), B(7,4,9), C(3,4,9), and D(8,6,8), apply a translation of 5 units along the X-axis, 4 units along the Y-axis, and 3 units along the Z-axis. Determine the new coordinates $(\bar{x}, \bar{y}, \bar{z})$ of the rectangle.
(e) Given a 3D triangle with coordinates A(3,4,1), B(6,4,2), and C(5,6,3), apply a reflection about the XY-plane. Determine the new coordinates $(\bar{x}, \bar{y}, \bar{z})$of the triangle.
(f) Given a 3D square with coordinates A(0,3,3), B(3,3,6), C(3,0,1), and D(0,0,0), apply a scaling factor of 2 along the X-axis, 3 along the Y-axis, and 3 along the Z-axis. Determine the new coordinates $(\bar{x}, \bar{y}, \bar{z})$ of the square.

Q.3 Answer the following (any three) **(15)**

(a) Define 3D Viewing and explain with four examples.
(b) Illustrate the difference between Radiometry, Photometry, and Colorimetry (any four points).
(c) What is an Arbitrary 3D View? Explain its process.
(d) Describe the stages of 3D Viewing (any four).
(e) Define CVV (Canonical View Volume) and explain its importance.
(f) Explain the types of projection.

Q.4 Answer the following (any three) **(15)**

(a) Write a short note on the Back-Face Culling Algorithm.
(b) Write a short note on the Z-Buffer Algorithm.
(c) Explain the Painter's Algorithm with an example.
(d) Define a BSP (Binary Space Partitioning) Tree with an example.
(e) Define Parametric Curves with an example.
(f) Define B-Spline Curves with an example.

Q.5 **Answer the following (any three)** (15)

(a) What is Animation? Explain the different types of animation.
(b) Differentiate between a static image and an animated image.
(c) Define an image and explain different image file formats.
(d) Explain the principles of animation (any four).
(e) What is Smoothing and Filtering?
(f) Illustrate Histogram Equalization.

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