Sub Code:RIT070

Paper Id: | **910205** | **Roll No:** | | | | | | | | | | | |

B. TECH.
(SEM VII) THEORY EXAMINATION 2019-20
COMPUTER GRAPHICS

Time: 3 Hours   *Total Marks: 70*
Note: **1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. **Attempt *all* questions in brief.**   **2 x 7 = 14**
   a. What is rasterization?
   b. Explain the term pixel, Aspect Ratio, Resolution.
   c. Define Translation, Rotation, Shearing and Reflection.
   d. What is projection? Give its types.
   e. List the properties of B-Spline.
   f. Distinguish between window port & view port?
   g. Define Filled area primitives. What are the common methods used?

SECTION B

2. **Attempt any *three* of the following:**   **7 x 3 = 21**
   a. Discuss the digital differential analyzer (DDA) line drawing algorithm in detail. Also give its advantages and disadvantages.
   b. Use the Cohen-Sutherland algorithm to clip a line P (70, 20) and Q (100,10) to clip a line against a window with lower left-hand corner (50,10) and upper right-hand corner (80,40).
   c. With suitable examples, explain all 3D transformations.
   d. Make a comparison of Bezier and B-spline algorithm for curve generation.
   e. Explain the A-Buffer method's algorithm. Give its important advantages over Z-buffer algorithm.

SECTION C

3. **Attempt any *one* part of the following:**   **7 x 1 = 7**
   (a) Write down and explain the midpoint circle drawing algorithm. Assume 10 cm as the radius and co-ordinate origin as the center of the circle.
   (b) What is a Raster scan display? Explain the process of generating a Raster image.

4. **Attempt any *one* part of the following:**   **7 x 1 = 7**
   (a) Explain Liang Barsky line clipping algorithm. Apply the algorithm to clip the line with coordinates (30, 60) and (60, 20) against window $(x_{min}, y_{min}) = (10, 10)$ and $(x_{max}, y_{max}) = (50, 50)$.
   (b) Write Sutherland- Hodgeman polygon clipping algorithm. Also describe the modification given by Weiler and Atherton for concave polygon.

5. **Attempt any *one* part of the following:**   **7 x 1 = 7**
   (a) What is the significance of homogeneous coordinate system in graphics? Give 3D transformation matrices for rotation in homogeneous coordinate system. Magnify the triangle with vertices A (0, 0), B (1, 1), C (5, 2) to twice its size keeping C (5, 2) fixed.
   (b) Differentiate parallel and perspective projections and derive their projection matrices.

6. **Attempt any *one* part of the following:**   **7 x 1 = 7**
   (a) Find the equation of a bezier curve which passes through the points (0,0) and (-2,1) and is controlled through the points (7,5) and (2,0). Also, explain the concept of a cubic bezier curve.
   (b) What do you mean by quadric surfaces? Explain any two quadric surfaces in Cartesian system. Also give the procedure to draw them.

7. **Attempt any *one* part of the following:**   **7 x 1 = 7**
   (a) What are various Back Face detection algorithms? Explain any one of them.
   (b) Describe phong and Specular reflection model.