

THEORY EXAMINATION (SEM-IV) 2016-17
COMPUTER GRAPHICS

Time : 3 Hours

Max. Marks : 100

Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.

SECTION – A

- 1. Explain the following:** **10 x 2 = 20**
- Why do we need video controller?
 - Trace the points for drawing a line from (0,0) to (-6,-6) using simple DDA algorithm.
 - Define refresh buffer.
 - Give the transformation matrix for rotation about an arbitrary point P in space.
 - Prove that the two successive rotations are commutative.
 - Write how shear transformation works.
 - List the properties of B-spline curves.
 - Differentiate between specular reflection and diffuse reflection.
 - How a viewport differs from the window?
 - What do you mean by aliasing and antialiasing? Give examples

SECTION – B

- 2. Attempt any five parts of the following questions:** **5 x 10 = 50**
- Develop the Bresenham's line drawing to draw lines of any slope. Compare this with the DDA Algorithm.
 - Given a 25cm x 20cm display operating in 1024 x 768 x 16 color mode which is refreshed 30 times per second, and for which 10% of the refresh cycle is spent in retrace, calculate
 - the pixel aspect ratio,
 - the size of the frame buffer, and
 - the required data transfer rate in kilobytes per second.
 - Given a window bordered by (1,2) at the lower left and (16,12) at the upper right, give the screen coordinates of a triangle with vertices (3,2), (10,7.5) and (5,5) when mapped into a viewport with corners (100,100) and (400,200). Provide accurate illustrations of the window, viewport, and the untransformed and transformed triangles with your answer.
 - Explain the essential difference between the "Scan-Line" hidden surface removal algorithm and the depth buffer technique.
 - Write the way of clipping a line using Cohen Sutherland algorithm.
 - Give a detailed explanation about quadratic surfaces and polygon surfaces.
 - Write down the detailed description of Warn model.

SECTION – C

Attempt any two parts of the following questions: **2 x 15 = 30**

- The figure ABCD where A=(-2,0), B=(0,-2), C=(-2,-4) and D=(-4,-2) can be transformed into A'B'C'D' where A'=(1,-1), B'=(3,3), C'=(6,3) and D'=(4,-1) by the composition of simple transforms $T_2 \cdot H_1 \cdot S_1 \cdot R_1 \cdot T_1$. Give the matrix form of these five transformations. Then express the composite transform using only one scale, one rotation and one translation.
- Explain Area Subdivision algorithm with suitable figure? List the advantages and disadvantages of Area Subdivision algorithm.
- Discuss in detail about visible surface detection methods.