Printed Pages : 1 **Roll No.** | | | | | | | | | | | **NCS403**

B.TECH.

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**

(a) Why do we need video controller?

(b) Trace the points for drawing a line from (0,0) to (-6,-6) using simple DDA algorithm.

(c) Define refresh buffer.

(d) Give the transformation matrix for rotation about an arbitrary point P in space.

(e) Prove that the two successive rotations are commutative.

(f) Write how shear transformation works.

(g) List the properties of B-spline curves.

(h) Differentiate between specular reflection and diffuse reflection.

(i) How a viewport differs from the window?

(j) 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**

(a) Develop the Bresenham's line drawing to draw lines of any scope. Compare this with the DDA Algorithm.

(b) 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

(i) the pixel aspect ratio,

(ii) the size of the frame buffer, and

(iii) the required data transfer rate in kilobytes per second.

(c) 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.

(d) Explain the essential difference between the "Scan-Line" hidden surface removal algorithm and the depth buffer technique.

(e) Write the way of clipping a line using Cohen Sutherland algorithm.

(f) Give a detailed explanation about quadratic surfaces and polygon surfaces.

(g) Write down the detailed description of Warn model.

SECTION – C

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

3 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 T2*H1*S1*R1*T1. Give the matrix form of these five transformations. Then express the composite transform using only one scale, one rotation and one translation.

4 Explain Area Subdivision algorithm with suitable figure? List the advantages and disadvantages of Area Subdivision algorithm.

5 Discuss in detail about visible surface detection methods.