Printed Pages: 02 **Sub Code: NCS403**

Paper Id: **110403** **Roll No.** | | | | | | | | | | |

B. TECH.
(SEM IV) CARRY OVER THEORY EXAMINATION 2017-18
COMPUTER GRAPHICS

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a) What is resolution?
b) Explain computer graphics.
c) Describe polygon.
d) Explain transformation.
e) Give window to viewport transformation matrix.
f) Define translation.
g) Define spline.
h) Describe B-spline curve.
i) Define clipping.
j) Describe video controller.

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. Give a 3×3 homogeneous matrix to rotate the image clockwise by 90°. Then shift the image to the right by 10 units. Finally scale the image by twice as large. All these transformations are to be done one after another in sequence.
b. Write procedure for rotation. Derive reflection matrix for reflection about X axis.
c. Distinguish between Raster and Vector graphics methods.
d. Describe briefly Bresenham's circle drawing algorithm.
e. How do we represent polygon using polygon table?

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

a. Distinguish between window port and view port. In 2D clipping how are lines grouped into visible, invisible and partially visible categories?
b. A cube is placed at the origin of 3D system. Such that all its vertices have positive coordinate values and sides are parallel to the three principal axes. Indicate a convenient position of a viewer at which he can see a 2-point perspective projection. Verify that such a view is generated.

4. Attempt any *one* part of the following: 10 x 1 = 10

a. Define vanishing points. Is the location of vanishing point directly related to the viewing point? Explain how?
b. What are the various logical gr tives. What are the various input modes in which they work?

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5. Attempt any *one* part of the following: 10 x 1 = 10

a. What is ray tracing algorithm for hidden surface removal? Explain mathematically how we find which planes are visible using ray tracing algorithm.

b. What are the two spaces in which hidden surface algorithms work? How does sorting and coherence speed up calculation in such algorithms?

6. Attempt any *one* part of the following: 10 x 1 = 10

a. Given control points (10,100), (50,100), (70,120) and (100,150). Calculate coordinates of any four points lying on the corresponding Beizer curve.

b. Derive simple illumination model. Include the contribution of Diffuse, ambient and specular reflection.

7. Attempt any *one* part of the following: 10 x 1 = 10

a. How are periodic B-spline curves different from non-periodic B-spline curves?

b. Which clipping algorithm is best suited for hardware implementation? Give how this algorithm works.

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