

Roll No. ....

**OLE-97678**  
**BCA 5th Semester (New)**  
**Examination – April, 2021**

**COMPUTER GRAPHICS**

**Paper : BCA-302**

*Time : Three Hours ]*

*[ Maximum Marks : 80*

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*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

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**Note :** Attempt *five* questions in all. Question Number 1 is *compulsory*. In addition to *compulsory* question, student has to attempt *four* more questions selecting *one* question from each Unit.

1. Write short answers to the following questions :

$8 \times 2 = 16$

- (a) Define persistence.
- (b) How are pixels addressable ?
- (c) How is scaling different than zooming ?

- (d) What are 8-connected regions ?
- (e) How are geometric transformations different than the co-ordinate transformations ?
- (f) What are the co-ordinates of the centre of a window of size  $200 \times 300$  placed in Cartesian coordinate system such that the lower left corner is at (250,250) ?
- (g) How are higher order curves useful in design ?
- (h) How does parallel projections important to engineers ?

## UNIT – I

- 2. (a) What are non-emissive display devices ? Explain the working of a LCD. 8
- (b) Explain the concept of scan line filling algorithm. 8
- 3. (a) What are color monitors ? How are colors managed on such devices ? Explain the role of lookup table. 8

- (b) Derive the speed of the display device in bytes/second if a device that uses 8 bits each for Red, Blue and Green color shade and has resolution  $800 \times 600$  and refresh rate 40 frames per second. 8

## UNIT – II

4. (a) Write the general form of homogeneous matrix for scaling keeping P(a, b) fixed. 8
- (b) What is a window ? How is it related to the viewport ? Derive the window to viewport mapping. 8
5. (a) What is a composite transformation ? Rotate a triangle ABC with A(0, 0), B(1, 1) and C(3, 2) by an angle of 45 degree from point B ? 8
- (b) Explain the Cyrus Beck line clipping algorithm. 8

## UNIT – III

6. (a) Differentiate between B-spline curves and Bezier curve. 6
- (b) How does the three color theory related to RGB colors ? Why Red, Green and Blue were chosen to be the primary colors in display devices ? Explain its relation with CMY color model ? 10

7. (a) What is three dimensional object rendering ? How can you represent a 3D object on a 2D plane ? What features are added to a 2D object to appear like a 3D object ? 8
- (b) Write short notes on :  $2 \times 4 = 8$
- (i) Hermite curve
- (ii) Polygon surfaces

#### UNIT – IV

8. Explain the process and transformation required for aligning a vector  $A_v$  with positive Z-axis. Assume different terms and variables required to answer the question. 16
9. What is Perspective Projection ? What are the features of perspective projections ? Explain all anomalies associated with such a projection. Can we overcome these anomalies ? Why ? 16