

A

(20322)

B. Sc. (Hons.)(Com. Sc.)-V Sem.

Roll No.

NS-3374(CV-III)

B. Sc. (Hons.) Examination, Dec. 2021

COMPUTER SCIENCE

Interactive Computer Graphics & Multimedia

(BHCS-501)

Time : 1 ½ Hours]

[Maximum Marks : 75



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Note : Attempt questions from all Sections as per instructions.

Section-A

(Very Short Answer Type Questions)

Answer any *two* questions out of the following five questions. Each question carries 7½ marks.

Very short answer is required not exceeding 75 words.

$$7\frac{1}{2} \times 2 = 15$$

1. Differentiate between Rotation, Translation and Scaling.

(2)

2. Define composite transformation and its need.
3. Define scan conversion in brief.
4. Explain Window to viewport transformation.
5. Explain Arc generation technique using DDA algorithm.

Section-B

(Short Answer Type Questions)

Answer any ~~one~~ ^{acedca.in} question out of the following three questions. Each question carries 15 marks. Short answer is required not exceeding 200 words. $15 \times 1 = 15$

6. Define Cubic Beizer Curve. A cubic curve is defined by the points (1, 1) (2, 3), (4, 4) and (6, 1). Calculate the coordinates of parametric midpoint, gradient (dy/dx) of the curve and also sketch the curve.
7. State Bresenham's circle drawing algorithm and find the list of activated pixels for the line AB with A(18, 10) and B(25, 15).

(3)

8. Give the transformation matrices for the various 3D transformation in homogeneous coordinates.

Section-C

(Detailed Answer Type Questions)

Answer any *two* questions out of the following five questions. Each question carries $22\frac{1}{2}$ marks.

Answer is required in detail.

$$22\frac{1}{2} \times 2 = 45$$

9. By performing a translation by 2, perform a 60 degree rotation of a triangle with vertices (1, 1) (2, 1) and (1, 2) about the point (0, -1). Also explain the steps need to be performed by the system for viewing transformation.

10. Define homogeneous coordinates systems and its use in computer graphics. A polygon has four vertices P(10, 10), Q(40, 10), R(40, 20), S(10, 20). Show the transformation matrix to double the size of the polygon with point P located at the same place. Show all the steps included and workout the coordinates of the transformed polygon.

(4)

11. Describe the B-spline curve and their application in detail.
12. “Hidden surfaces should be removed”, why ? Discuss the z-buffer method for removal of hidden surface.
13. Define shearing. Calculate the viewing transformation matrix for the following specification :
- A rectangle with coordinates : $P(1, 1)$, $Q(4, 1)$, $R(4, 4)$ and $S(1, 4)$
 - Given window coordinates : $(2, 2)$, $(5, 2)$, $(5, 5)$ and $(2, 5)$
 - Viewpoint location : $(0.5, 0)$, $(1, 0.5)$ and $(0.5, 0.5)$