लक्ष्यं विश्वमानम्

WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 6th Semester Examination, 2024

CMSACOR14T-COMPUTER SCIENCE (CC14)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

GROUP-A

1. Answer any ***four*** questions from the following: 2×4 = 8

   (a) What is shading in computer graphics?

   (b) What is frame buffer?

   (c) Define texture mapping.

   (d) Explain differences between 2D and 3D graphics.

   (e) What is homogeneous coordinate?

   (f) Prove that two scaling transformations are commutative i.e. $S_1 S_2 = S_2 S_1$

   (g) What do you mean by hidden surface removal?

GROUP-B

Answer any *four* questions from the following 8×4 = 32

2. (a) What is resolution of an image? 1+3+2+2

   (b) What are the differences between raster scan display and random scan display?

   (c) What are the advantages of Bresenham's line drawing algorithm over DDA?

   (d) What are the applications of computer graphics?

3. (a) Why is a homogeneous co-ordinate system needed in transformation matrix? 2+4+2

   (b) Translate the square ABCD whose co-ordinates are A (0, 0), B (3, 0), C (3, 3) and D (0, 3) by 2 units in both directions and then scale it by 1.5 units in horizontal direction and 0.5 units in vertical direction.

   (c) What do you mean by Shearing?

4. (a) What are the bit representations of the RGB color combinations of a simple 3-bit plane frame buffer? 2+1+4+1

(b) How many pixels are there in a 1024×1024 frame buffer?

(c) Using Midpoint Circle generation algorithm, find out the pixels in the first quadrant of a circle having radius 10 units and centre at (0, 10).

(d) What is interlacing?

5. (a) Explain Midpoint Circle drawing algorithm. 6+2

(b) Find the matrix that represents rotation of an object by 30° about the origin.

6. (a) Describe trigonometric method of defining an ellipse. 4+4

(b) Find the transformation that scales (with respect to origin) by a unit in the x direction and b unit in the y direction.

7. (a) Explain Sutherland-Hodgeman algorithm to clip a polygon. 5+3

(b) Write the properties of B-spline.

8. (a) Differentiate between viewport and window. 3+5

(b) Develop general form of 3D rotation about x axis and about y axis.

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