Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 70390

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Fifth Semester

Computer Science and Engineering

CS 6504 — COMPUTER GRAPHICS

(Common to : PTCS 6504 — Computer Graphics for B.E. (Part-Time) – Computer Science and Engineering – Fifth Semester (Regulations 2014))

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List out any four input devices that are used in graphics field.

2. Give the initial decision parameter equation for Bresenham's line drawing algorithm.

3. Compare interior and exterior clipping.

4. Define viewport.

5. Represent the parametric representation of a cubic Bezier curve.

6. Define projection plane and centre of projection.

7. What is the need for shading model?

8. List out various properties that describe the characteristics of light?

9. Differentiate Key frame systems from Parameterized Systems.

10. Mention the importance of morphing.

PART B — (5 × 13 = 65 marks)

11. (a) Explain in detail about the Line drawing DDA scan conversion algorithm with an example. (13)

Or

(b) Explain the following Video Displays Devices.

(i) Refresh cathode ray tube (4)

(ii) Raster Scan Systems (3)

(iii) Random Scan Displays (3)

(iv) Colour CRT Monitors (3)

12. (a) (i) Discuss the working of 2D Scaling with respect to origin and with respect to fixed (pivot) point with suitable example. (9)

(ii) Prove that two successive translations are additive. (4)

Or

(b) Describe how to clip the given lines using Cohen - Sutherland line clipping algorithm. Explain the above with suitable example and equations.

13. (a) (i) Determine the 3D transformation matrices to scale a line PQ in the x direction by 3 by keeping point P fixed. The rotate this line by 45°. Anticlockwise about the Z axis. Give P (1, 5, 2) and Q(4,5,6,3). (7)

(ii) Explain the different 3D object representations in detail. (6)

Or

(b) (i) Find the points on the Bezier curve which has starting and ending points P_0 (2, 3) and P_3 (4, –3) and is controlled by P_1 (5, 6) and P_2 (7, 1) for $u = 0.9$. (7)

(ii) Show that the Bezies curve always touches the starting point (for $u = 0$) and the ending point (for $u = 1$). (6)

14. (a) Discuss on colour spectrum, colour concepts and colour models in detail. (13)

Or

(b) Explain the illumination models in detail. (13)

15. (a) (i) Explain the different methods of motion specifications. (7)

(ii) Brief on the forces affecting object motion.

(1) gravitational $(3 \times 2 = 6)$

(2) electromagnetic

(3) friction.

Or

(b) (i) Brief on fractals and ray tracing. (3)

(ii) An e-publishing company is in the process of converting e-books in the form of document images to text. Discuss on the challenges faced by the company in implementing the process. (10)

PART C — $(1 \times 15 = 15$ marks)

16. (a) Use the Cohen Sutherland algorithm to clip line P1(70, 20) and P2(100, 10) against a window lower left hand corner (50, 10) and upper right hand corner (80, 40). (15)

Or

(b) Suppose we have a B-spline curve of degree 3 with a knot vector as follows : (15)

u0 to u3	u4	u5	u6	u7	u8 to u11
0	0.2	0.4	0.6	0.8	1

Insert a new knot t = 0.5, find new control points and new knot vector.

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