

Roll No.																			
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



**BENGALURU**  
**School of Computer Science & Engineering**  
**Mid - Term Examinations - November 2024**

**Semester:** V

**Date:** 07-11-2024

**Course Code:** CSE2066

**Time:** 02.00pm to 03.30pm

**Course Name:** COMPUTER GRAPHICS

**Max Marks:** 50

**Program:** B.TECH

**Weightage:** 25%

**Instructions:**

*(i) Read all questions carefully and answer accordingly.*

*(ii) Do not write anything on the question paper other than roll number.*

---

**Part A**

**Answer ALL the Questions. Each question carries 2 marks.**

**5Qx2M=10M**

- |   |   |         |    |     |
|---|---|---------|----|-----|
| 1 | Define the two main types of computer graphics.                     | 2 Marks | L1 | C01 |
| 2 | List the two main differences between LCD and LED.                  | 2 Marks | L1 | C01 |
| 3 | What is point clipping?   | 2 Marks | L1 | C02 |
| 4 | Recall the four cases for line clipping.                            | 2 Marks | L1 | C02 |
| 5 | What are the four major areas of application for computer graphics? | 2 Marks | L1 | C02 |

---

**Part B**

**Answer ALL Questions. Each question carries 10 marks.**

**4Qx10M=40M**

- |   |  |          |    |     |
|---|--|----------|----|-----|
| 6 | Explain and Apply Bresenham's line drawing algorithm to determine the coordinates of the line between the points (3, 2) and (9, 4). Show all the intermediate calculations and points. | 10 Marks | L1 | C01 |
|---|--|----------|----|-----|

**or**

- |   |   |          |    |     |
|---|---|----------|----|-----|
| 7 | Explain and apply the midpoint circle drawing algorithm to determine the points that will be plotted for a circle with radius $r=6$ , centered at (0, 0). Show all the intermediate calculations. | 10 Marks | L3 | C01 |
|---|---|----------|----|-----|

- 8 a.** Outline the process of object representation on a screen using Raster Scan with the help of a diagram. 5 Marks L2 CO1
- b.** Summarize the properties of CRT (Cathode-Ray Tube) and LCD (Liquid Crystal Display) monitors. Mention one major advantage and disadvantage of each. 5 Marks L2 CO1

**or**

- 9 a.** Outline the working principle of the Beam-Penetration Method in CRT monitors. 5 Marks L2 CO1
- b.** Compare emissive and non-emissive flat panel displays, providing examples for each and explaining how they differ in their operation and application. 5 Marks L2 CO1

- 10 a.** Demonstrate how to use homogeneous coordinates to magnify the triangle ABC, where  $A = (0, 0)$ ,  $B = (1, 1)$ , and  $C = (4, 2)$ , to twice its size while keeping point C  $(4, 2)$  fixed. Show the new coordinates of the triangle. 5 Marks L2 CO2
- b.** Describe the steps involved in performing a 2D rotation around a general pivot point  $(x_r, y_r)$ . Explain why the translate-rotate-translate sequence is necessary and how the composite transformation matrix is formed. 5 Marks L2 CO2

**or**

- 11 a.** Explain the process of performing 2D scaling around a general pivot point. Describe why a translation is needed before and after the scaling operation, and how the matrices are concatenated to produce the final transformation. 5 Marks L2 CO2
- b.** Calculate the new coordinates of the triangle ABC, where  $A = (2, 3)$ ,  $B = (5, 5)$ , and  $C = (4, 3)$ , after rotating it by an angle of 45 degrees about the point  $(1, 1)$  using the homogeneous coordinates transformation matrix. Show the steps involved in constructing and applying the transformation matrix. 5 Marks L2 CO2

- 12** Explain the Cohen-Sutherland algorithm for line clipping. Determine the region codes for the endpoints of line  $P1(0, 40)$  and  $P2(90, 100)$  with respect to the rectangular window ABCD, where  $A = (20, 20)$ ,  $B = (90, 20)$ ,  $C = (90, 70)$ , and  $D = (20, 70)$ . Apply the 10 Marks L3 CO2

Cohen-Sutherland algorithm to calculate the clipped coordinates of the line segment.

**or**

- 13** Explain the Sutherland-Hodgman polygon clipping algorithm. 10 Marks L3 CO2  
Apply the Sutherland-Hodgman polygon clipping algorithm to clip the polygon with vertices A(2, 2), B(6, 2), C(6, 6), and D(2, 6) against the clipping window defined by  $(x_{wmin}, y_{wmin})=(4,3)$  and  $(x_{wmax}, y_{wmax})=(7,7)$ . Determine the new set of vertices for the clipped polygon and show all the intermediate steps.