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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 13- 01-2025 **Time:** 09:30 pm – 12:30 pm |

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| **School:** SOCSE | **Program:** B. Tech CEI/COM | |
| **Course Code :** CSE2066 | **Course Name :** Computer Graphics | |
| **Semester**: V | **Max Marks**:100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **24** | **24** | **26** | **26** | **-** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** | | | | |
| **1** | Define computer graphics. List the major areas of computer graphics. | **2 Marks** | **L1** | **CO1** |
| **2** | Define circle. Mention the properties of circle. | **2 Marks** | **L1** | **CO1** |
| **3** | Define uniform and differential scaling. | **2 Marks** | **L1** | **CO2** |
| **4** | List the six clipping types. | **2 Marks** | **L1** | **CO2** |
| **5** | Define vanishing point. | **2 Marks** | **L1** | **CO3** |
| **6** | Recall 3D rotation Z axis matrix. | **2 Marks** | **L1** | **CO3** |
| **7** | Outline the techniques of curve representation. | **2 Marks** | **L2** | **CO4** |
| **8** | Define quadric surfaces. | **2 Marks** | **L1** | **CO4** |
| **9** | Define clipping window and viewport. | **2 Marks** | **L1** | **CO3** |
| **10** | List the various parametric and geometric continuity of curves. | **2 Marks** | **L1** | **CO4** |

**Part B**

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| **Answer the Questions Total 80 Marks.** | | | | | |
| **11.** | **a.** | **(i)**Explain various steps involved in DDA line drawing algorithm and Bresenham’s line drawing algorithm.  **(ii)**Illustrate the basic structure of OpenGL program. Create a window and display a line in that window using OpenGL program. | **(10+10)Marks** | **L2** | **CO1** |
| **or** | | | | | |
| **12.** | **a.** | **(i)**Illustrate the working principle of CRT and Color CRT with neat sketch. List the advantages and disadvantages of CRT and Color CRT.  **(ii)**Demonstrate the points between the starting point (9,18) and ending point (14, 22) using Bresenham’s line drawing algorithm. | **(10+10) Marks** | **L2** | **CO1** |
|  |  |  |  |  |  |
| **13.** | **a.** | **(i)**Explain the various steps of pivot point scaling and rotation with neat sketch.  **(ii)**Let ABCD be the rectangular window with A(20,20), B(90,20),C(90,70) and D(20,70).Find the region code for the end points and use Cohen Sutherland algorithm to clip line P1(10,30) and P2(80,90).  **(iii)**Consider the clipping window and the lines shown in Figure 1. Apply Cohen-Sutherland Line Clipping algorithm to calculate the region codes for each end points and identify whether the line is completely visible, partially visible or completely invisible.    **Figure 1** | **(5+10+5) Marks** | **L3** | **CO2** |
| **or** | | | | | |
| **14.** | **a.** | **(i)**Illustrate Liang Barsky line clipping algorithm steps. Identify the clipping coordinates for a line P1P2 where P1 =(50,25) and P2=(80,50) against window with (xwmin,ywmin)=(20,10) and (xwmax,ywmax)=(70,60) using Liang Barsky Line clipping algorithm.  **(ii)**Explain the four cases of Sutherland-Hodgman polygon clipping. For a polygon and clipping window shown in Figure 2, compute the list of vertices after each boundary clipping.    **Figure 2** | **(10+10) Marks** | **L2** | **CO2** |

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| **15.** | **a.** | Illustrate the following:  (i)Composite 3D Translation.  (iii)Composite 3D Rotation.  (iii)Composite 3D Scaling and  (iv)Three-Dimensional Cohen–Sutherland Line Clipping. | **(5+5+5+5) Marks** | **L2** | **CO3** |
| **Or** | | | | | |
| **16.** | **a.** | **(i)**Define projection. Explain parallel projection and perspective projection along with its various types. Mention its advantages and disadvantages.  **(ii)**Perform 3D rotation transformation over a cube ‘OABCDEFG’ as shown in Figure 3 and rotate it through 450 in the anticlockwise direction about the y-axis and obtain the new coordinates of the object.    **Figure 3** | **(10+10) Marks** | **L2** | **CO3** |

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| **17.** | **a.** | Illustrate the following parametric representation with appropriate diagram.   1. Curve. 2. Circle. 3. Ellipse. 4. Parabola and 5. Hyperbola. | **(4+4+4+4+4) Marks** | **L2** | **CO4** |
| **Or** | | | | | |
| **18.** | **a.** | **(i)**Define interpolation and approximation spline. Explain Bezier curve with an example. Outline the five properties of Bezier curve.  **(ii)**Define curve. Explain various representation of curves with appropriate example and its limitations. | **(10+10) Marks** | **L2** | **CO4** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***