TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEI	Pass Marks	32
Year / Part	II / II	Time	3 hrs.

Subject: - Computer Graphics (*EX 554*)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What is refresh rate? Calculate the size of frame buffer in KB needed to represent the screen of size 4 inch × 5 inch whose resolution is 128 dpi and uses the 8-bit true color. [4]
2. Devise Bresenham's decision parameter for a straight line with negative slope with $|m| < 1$, applying right to left sampling. Assume that the line lies in the second quadrant. [10]
3. Derive the transformation matrix to reflect the object from line $y = mx + c$. [5]
4. Define window to view port transformation. Clip the line RS, R (2, 4) and S (8, 7) against the window WXYZ, W(3, 3), X(3, 6), Y(7, 6), and Z(7, 3) using Cohen Sutherland algorithms. [5]
5. Describe 3-D viewing pipeline. Obtain the perspective projection matrix for the projection reference point lies on the negative Z-axis. [5+5]
6. What is the importance of parametric cubic curve in graphical modeling? Derive the relation of blending function of Hermite curve using interpolation. [5]
7. Given a Bezier curve with 4 control points A(1, 0), B(3, 3), C(6, 3), D(8, 1). Determine any 5 points lying on the curve. Also draw a rough sketch of the curve. [5]
8. Compare object space method and image space method. Describe the back face detection method with necessary figures and apply this algorithm to find the visibility of a triangular object defined by coordinates (2, 0, 0), (0, 2, 0), (0, 0, 2) when viewed from point (4, 4, 4). [2+4+4]
9. Classify the different types of visible surface detection techniques. Explain about back face detection method for visible surface detection. [5]
10. List the disadvantage of depth buffer method. Explain how scan line method detects the visible surface with example. [5]
11. Write a general illumination model with multiple light sources and explain each term with necessary figures. What is the attenuation factor and how does it affect the intensity calculation? [6]
12. Briefly explain Gouraud shading and Phong shading algorithms with necessary derivations and figures and compare these algorithms. [6]
13. Define callback function. Demonstrate how a polygon can be created using OpenGL. [4]

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