

TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
**Examination Control Division**  
2079 Baishakh

Exam.	Back		
Level	BE	Full Marks	80
Programme	BEX, BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

**Subject: - Computer Graphics (EX 603)**

- ✓ 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 are the differences between random and raster display technologies? When do we prefer them? [6]
2. Write an algorithm for Bresenham's method of line drawing. Digitize a line with end points (10, 20) and (15, 2) using this algorithm. [5+5]
3. Find the composite transformation matrix for reflection about a line  $y = mx + c$ . [8]
4. Describe polygon, Vertex and Edge table. How these terms can be used to construct a model of Dharahara. [2+2+2+2]
5. What do you understand by affine transformation? Derive expressions for oblique projective and parallel projection. [2+4+4]
6. What is a Bezier Curve? Find the coordinates of Bezier curve at  $u = 0.25, 0.5$  and  $0.75$  with respect to the control points (10, 15), (15, 20), (20, 35), (25, 10) using Bezier function. [1+5]
7. How back-face detection method is used to detect visible surfaces? What are its limitations? Propose an approach to overcome its limitations. [4+2+4]
8. Derive an expression for Phong illumination model for light sources. [8]
9. Find out the total intensity at the centroid of a triangle defined by A(2,1,1), B(0,1,1), C(0,0,1), when illuminated by a point light source of intensity  $I_L = 0.6$  at (2,2,6) using illumination model. The viewer is at (2,3,6). Assume ambient Intensity  $I_a = 0.1$  and parameters:  $k_a = 0.5$ ,  $k_d = 0.8$ ,  $k_s = 0.7$ , take  $n = 10$ . [8]  
[centroid:  $(x_1 + x_2 + x_3)/3$ ,  $(y_1 + y_2 + y_3)/3$ ,  $(z_1 + z_2 + z_3)/3$ ]
10. What is open GL? How can we use lighting in open GL? [2+4]

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