TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Bhadra

Exam.	**Regular**		
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. Consider a raster system with a resolution of 1920 × 1080. How much storage is required if 24 bits per pixel are to be stored in a device with refresh rate of 50 Hz? Find out the aspect ratio. [4]
2. How do you apply symmetry concept while drawing circle? Calculate the point in the circumferences of the circle having radius 8 unit and center at (+8, 10) using midpoint circle algorithm. [2+6]
3. What do you mean by homogenous coordinates? By listing the steps involved, find out the final composite matrix for performing a rotation by 45 degrees about an arbitrary point (5, 5) in anti-clockwise direction. Use the obtained composite matrix to obtain the transformed coordinates of a triangle A(5, 6), B(6, 2) and C(4, 1). [1+5+2]
4. Explain about 3D viewing pipeline. How world-to-viewing coordinate transformation is performed? Describe with expression. [5+5]
5. Write the properties of Bezier curve. A cubic Bezier curve is described by the four control points. (0, 0), (3, 1), (5, 2) and (8, 1). Find the Bezier polynomial and the coordinate at f = 0.25, 0.5, 0.75. [3+8]
6. What is polygon table? List the rules for making error free polygon table. How do you calculate the spatial orientation of a polygon? [3+2+4]
7. Compare object space method and image space method. Explain depth buffer method in detail. Compare it with A-buffer method. [2+5+3]
8. 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 (3, 2, 8) using Phong Illumination model. The viewer is at (4, 3, 8). Assume ambient intensity Ia = 0.1 and parameters: ka = 0.5, kd = 0.8, ks = 0.7, take x = 5. [centroid: (x1 + x2 + x3)/3, (y1 +y2 y3)/3, (z1 + z2 +z3)/3]. Explain briefly different ways of shading this triangle. [8+6]
9. Why OpenGL is used? Write the basic command to draw the pixel rectangle and polygon in OpenGL. [2+4]

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