

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Computer Graphics (new)

Semester: Fall

Year : 2023
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is Computer Graphics? Differentiate between raster and random display with its architecture. 8
- b) Why do we need hardware acceleration for graphics processing? Explain the significance of GPU in modern computer organization. Compare CPU with GPU. 7
2. a) What is scan conversion? How can equations be derived for drawing lines with slope greater than one using Bresenham's line drawing algorithm? Explain. 8
- b) What is composite transformation. Explain why do we need homogeneous coordinate system for transformation of computation in computer graphics. 7
3. a) How symmetric property of circle can be implemented to digitize circle having equation $(x-4)^2 + (y+5)^2 = 36$. Illustrate with necessary calculations using mid-point circle drawing algorithm. 8

OR

What is window and viewport? Magnify the triangle with vertices A(0,0) B(1,1) and C(5,2) to thrice its size while keeping C(5,2) fixed.

- b) Explain the Sutherland Hodgeman polygon clipping algorithm considering the four different cases with example. 7

OR

Let R be the rectangular window whose lower left hand corner is at L (-3, 1) and upper right-hand corner is at R (2, 6). Use Cohen – Sutherland algorithm to clip the line segments A (-4, 2) and B (-1, 7).

4. a) How are Two Dimensional Rotations different from Three 7

Dimensional Rotations? Explain with the matrix representations.

- b) Derive the blending function for parametric cubic curve using Hermite interpolation technique. 8
5. a) What are the drawbacks of Flat shading and Gouraud shading? How does normal vector interpolation scheme remove these drawbacks? 7
- b) Explain painter's algorithm for visible surface detection with its necessary test cases. 8
6. a) Define GKS and PHIGS. Mention different types of Graphics file format used in computer graphics. 8
- b) How OpenGL APIs can be used to maintain graphical standards? Explain. 7
7. Write short notes on: (Any two) 2×5
- a) Color Models
- b) 2D viewing pipeline
- c) Frame Buffer