**Kathmandu BernHardt College**

**Bafal, Kathmandu**

**Pre-Board Examination -2070**

**Faculty: Science Set ‘A’ FM: 60**

**Subject: Computer Graphics.** (CSC 254) **PM: 24**

**Level: BSc CSIT IV SEM Time: 3 hrs**

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

**Group-A**

**Attempt all questions:**  **10×6=60**

1. What is a computer graphics? Explain the application areas of computer graphics.
2. What do you mean by horizontal and vertical retrace? Calculate the fraction of the total refresh time per frame spent in retrace of the electron bean for a noninterlaced raster system with a resolution of 1280 by 1024, a refresh rate of 60 Hz, a horizontal retrace time of 5 microseconds and a vertical retrace time of 500 microseconds.
3. Explain the Bresenham’s approach to draw a line. **OR**

Use the midpoint method and symmetry considerations to scan convert the parabola x=y2

for the interval -10≤y≤10.

1. Explain the following term with practical applications.

(a) 2D Shear

(b) 3D Scaling **OR**

Determine the form of the transformation matrix for a reflection about and arbitrary line with equation y=mx+b.

1. Write a routine to clip a circle against a rectangular window.
2. How can we represent the 3D object using polygon table? Explain with example.
3. What is projection of an object? Why it is necessary? How perspective projection differs from parallel projection?
4. Explain the ray tracing method for hidden surface removal. How it differs from scan line method?
5. Explain in detail about Gourand shading model. Compare it with Phong shading model.
6. Consider 512 pixel X 512 scan lines image with true color. If 10 minutes video is required to capture with frame rate 24, calculate the total memory required? Why intensity assignment is required?

**The End**

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**Kathmandu BernHardt College**

**Bafal, Kathmandu**

**Pre-Board Examination -2070**

**Faculty: Science Set ‘B’ FM: 60**

**Subject: Computer Graphics.**(CSC 254) **PM: 24**

**Level: BSc CSIT IV SEM Time: 3 hrs**

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**Group-A**

**Attempt all questions:**  **10×6=60**

1. What do you mean by refresh rate in CRT monitor? How much time is spent scanning across each row of pixels during screen refresh on a raster system with a resolution of 1280 by 1024 and a refresh rate of 60 frames per second?
2. What is a digital differential analyzer (DDA)? How can you draw the line using this algorithm?

**OR**

Use the midpoint method and symmetry considerations to scan convert the parabola Y=100-x2 Over the interval -10≤x≤10.

1. What is the use of symmetry while drawing circle? Explain the different types of symmetry.
2. How can we represent the 3D object using polygon meshes? Explain with example.
3. What do 4-connected and 8-connected mean? Write a boundary fill procedure to fill an 8-connected region.
4. Explain Cohen-Sutherland line-clipping algorithm.
5. Explain 3D pipeline process for representing the word coordinate scene to device coordinate system.

**OR**

What is projection of an object? Why it is necessary? How perspective projection differs from parallel projection?

1. Explain the depth buffer method for visible surface detection. How it differs from depth sorting method?
2. Why shading is required in the computer graphics? Explain in detail about constant intensity shading.
3. Consider 512 pixels X 512 scan lines image with true color. If 5 minutes video is required to capture with frame rate 24, calculate the total memory required? What is the color intensity model?

**The End**

**Kathmandu BernHardt College**

**Bafal, Kathmandu**

**Pre-Board Examination -2070**

**Faculty: Science Set ‘B’ FM: 60**

**Subject: Computer Graphics.**(CSC 254) **PM: 24**

**Level: BSc CSIT IV SEM Time: 3 hrs**

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**The End**