TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2082 Kartik

Exam.	Back (New Course)		
Level	BE	Full Marks	60
Programme	BEI, BCT	Pass Marks	24
Year / Part	II / I	Time	3 hrs.

Subject: - Computer Graphics and Visualization *(ENCT 201)*

- ✓ *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. Calculate the time required to display a pixel on the monitor of size 1024 x 768 with refresh rate of 60 Hz. Draw block diagram of 3D viewing pipeline. [3+2]
2. a) How is the symmetric property vital while drawing an ellipse? Write an algorithm to draw ellipse in raster graphics system. [2+5]
   b) Explain Weiler Atherton polygon clipping polygon clipping in with an example. [5]
3. a) Explain the composite rotation in 2D transformation. Given the point (0,0) (1,0) (0,1) and (1,1) where Xref = -1 and Shy = 0.5. Calculate and sketch shearing transformation new coordinates. [4]
   b) Reflect the object (2, 3), (4,3), (4,5) about the line y = x+1. [4]
   c) Why we need perspective projection in 3D environment? Explain transformation from world to viewing coordinates. [2+3]
4. Illustrate space partitioning representation in brief. How polygon meshes support to represent 3D object? Explain with relevant figures. [3+3]
5. Differentiate between image-space and object-space methods for hidden surface detection. How does A-Buffer method determine the hidden surfaces? [1+4]
6. Define Specular reflection. Explain Fast Phong shading models with relevant expression. [1+4]
7. What is anti-aliasing methods in computer animation? Illustrate typical process of morphing in computer graphics. [2+5]
8. Explain key components of a virtual reality system in brief. Write down an application of AR system. [5+2]

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
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2081 Chaitra

Exam.	Regular (New Course)		
Level	BE	Full Marks	60
Programme	BEI,BCT	Pass Marks	24
Year / Part	II / I	Time	3 hrs.

Subject: - Computer Graphics and Visualization *(ENCT 201)*

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- ✓ *Attempt **All** questions.*
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- ✓ *Assume suitable data if necessary.*

1. What is computer visualization? Calculate the frame buffer size for a raster system recording a video for 1 min with resolution of 1280 x 1024 and storing 24 bits per pixel with a refresh rate of 25 fps. [1+4]
2. a) How the decision parameter can be used to draw a Circle? Draw the circle with the radius 7 and centre (10,15). [2+5]
   b) Differentiate between boundary fill and flood fill Algorithm. [3]
   c) Use the Cohen-Sutherland line clipping algorithm to clip two lines $P_1(40,50)$ - $P_2(75,45)$ and $P_3(70,20)$ - $P_4(100,10)$ against a window A (50,10), B (80,10), C (80,40) and D (50,40). [4]
3. a) Suppose there is a rectangle whose coordinates are A(1,1), B(4,1), C(4,4), D(1,4) and the window coordinates are (2,2), (5,2), (5,5), (2,5) and the given viewport location is (0.5,0), (1,0), (1,0.5) , (0.5,0.5). Calculate the viewing transformation. [4]
   b) Write the steps required to rotate an object in 3D about arbitrary axis. Explain about the perspective projection. [5]
   c) Differentiate between Parallel Projection and Oblique Projection. [3]
4. Define spline curve. Explain Hermite curve for 3-degree polynomial with required expression. [1+4]
5. Why do you mean by back face detection? Explain the Z buffer method for visible surface detection in detail with its limitation. [1+4]
6. Explain the Phong shading algorithm. Mention the advantages of fast Phong shading overphong shading method. [1+4]
7. What is raster animation? Explain about motion specification in computer animation. [2+5]
8. Explain distributed scene rendering in brief. Differentiate between AR, VR and MR technology. [3+4]

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