

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.



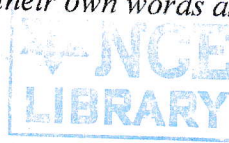
1. Calculate the time required to display a pixel on the monitor of size 1024 x 768 with refresh rate of 60 Hz. Draw block diagram of 3D viewing pipeline. [3+2]
2. a) How is the symmetric property vital while drawing an ellipse? Write an algorithm to draw ellipse in raster graphics system. [2+5]
b) Explain 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 $X_{ref} = -1$ 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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2081 Chaitra

Exam.	Regular (New Course)		
Level	BE	Full Marks	60
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Year / Part	II / I	Time	3 hrs.

Subject: - Computer Graphics and Visualization (ENCT 201)

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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]
