

SCHOOL OF ENGINEERING, CUSAT

B. TECH DEGREE SECOND INTERNAL EXAMINATION JANUARY 2023

Semester V Course Title: 504 Computer Graphics

Faculty: Dr. Latha R Nair

Time: 2Hrs

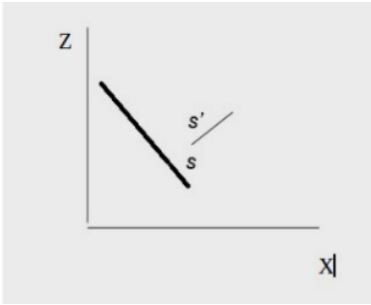
Max. Marks: 50

CO1	On completion of this course the student will be able to: Explain the organisation of an interactive computer graphics system.
CO2	Generate 2D and 3D geometrical objects.
CO3	Explain the important transformations on graphical objects.
CO4	Fill a region given boundary and clip lines and polygons against a rectangular boundary.
CO5	Describe the different types of curves and generate curves.
CO6	Apply the operations like projections and rendering for 3D picture generation.
CO7	Design graphical objects.
CO8	Design interactive graphics systems and animation systems

Bloom's taxonomy levels(L1-Remember, L2-Understand, L3-Apply, L4-Analyze L5-Evaluate L6-Create),PO-Program outcome

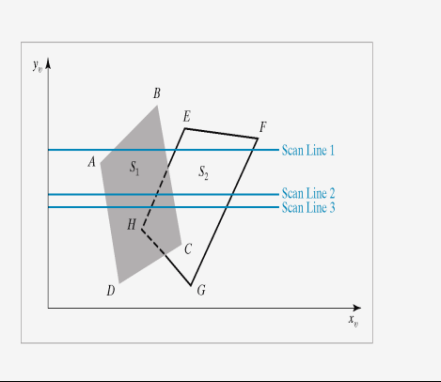
PART A- Answer all questions (5x4=20)

			BL	CO	PO
I	a	Write the vertex table, edge table and surface table for a cube with side 3 units and placed with one vertex at the origin, the edges forming the vertex along X ,Y and Z axis and its base on X-Z plane (4marks)	3	co7	1,2,3,10,12
	b	i) How 3 dimensional picture definition can be plotted on a 2d screen. (2 marks)	2	co6	1,2,3,10,12
		ii) What are the factors which affect the final projected point (2 marks)	2	co6	1,2,3,10,12
	c	Sort the following two surfaces using Painter's algorithm. Assume we look towards positive direction of z axis shown in the diagram. List the tests to arrive at the answer (4 marks)	2	co6	1,2,3,10,12

					
d	i) What kind of surfaces create diffused reflection rough or smooth? (1 mark)	1	co6	1,2,3,10,12	
	ii) Write the diffuse reflection model (2marks)	1	co6	1,2,3,10,12	
	iii) How the angle of incidence affect the intensity produced according to Lamberts cosine law? (1 mark)	2	co6	1,2,3,10,12	
e	i) What is modeling transformation? Give one example (2marks)	2	CO7	1,2,3,10,12	
	ii) What are the different ways to create animation? (2marks)	4	co8	1,2,3,4,5,6,8,10,12	

PART B -Answer Any three questions (10*3=30)

II	i) What is Z buffer algorithm? (4marks)	1	co6	
	ii) How can you speed up the depth calculation in z-buffer algorithm? (2 marks)	2	co6	
	Iii) What are the additional features considered in A buffer? (2marks)	1	co6	
	iv) How each parameter affects the final intensity calculated?(2 marks)	2	co6	
III	i) Mark the intersection points with the scanline with the surface edges.(2marks)	2	co6	

				
	ii) What are the surfaces visible at the intersection points in scanline 3? (2 marks)	2	co6	
	iii) How can we determine which surface is visible at each intersection point in scanline 3? (2marks)	3	co6	
	iv) What will be the color for each section identified along the scanline 3 (2marks)	3	co6	
	v) How information from this scanline can be used to speed up the calculation for the scanline2 (2marks)	3	co6	
IV	i) The verices of a triangular surface are (30,40,10) (50,100,50)(150,50, 10). What are the orthographic projected points assuming X-Y plane is the plane of projection. (2 marks)	3	co6	
	ii) How can we calculate the average normal at each vertex of a polygonal mesh? (1 mark)	3	co6	
	iii) Write the steps to interpolate intensities in gourad shading (2 marks)	1	co6	
	iv) The intensities at the three vertices are 3,4 and 5 units respectively. Find the intensity at the point (80,60) using gourad shading. Assume orthographic parallel projection. (5 marks)	3	co6	
V	i) Describe how different types of fractals can be created (4marks)	2	co7	
	ii) Find the suitable fractal method to create the following shapes: mountain, ice flake, koch curve justify your answer (2 marks)	2	co7	
	iii) Give the formula for fractal dimension. (2 marks)	2	co7	
	iv)Write how hierarchical modelling can be used to design a school building with many classrooms (2 marks)	2	co7	

L1=16% L2=56% L3=20% L4=8% L5= % L6=%