RollNo.

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER ARREAR EXAMINATIONS, APRIL / MAY 2024

INFORMATION TECHNOLOGY

IT5008 – COMPUTER GRAPHICS
(Regulation 2019)

Time:3hrs   Max.Marks: 100

CO1	Articulate the concepts and techniques used in three-dimensional graphics.
CO2	Understand and Implement algorithms related to graphics creation.
CO3	Design and model graphical structures.
CO4	Understand and comprehend the graphical algorithms
CO5	Design visually realistic graphical applications
CO6	Design and develop simple and realistic animations.

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A (10x2=20Marks)
(Answer all Questions)

Q. No.	Questions	Marks	CO	BL
1	Compare absolute co-ordinates and relative co-ordinates.	2	CO1	L2
2	What is the difference between clipping window and viewport with respect to camera?	2	CO1	L2
3	For what purpose geometric transformation is done?	2	CO2	L2
4	Which OpenGL function is used to scale an object?	2	CO2	L1
5	How objects are displayed in perspective foreshortening representation?	2	CO3	L1
6	Define Depth cueing.	2	CO3	L1
7	Write the characteristics of blobby objects.	2	CO4	L1
8	Define ray casting.	2	CO4	L1
9	Differentiate between Self-affine and Invariant fractals sets.	2	CO5	L2
10	Give any two application of morphing.	2	CO6	L2

PART- B (5x 13=65Marks)
(Restrict to a maximum of 2 subdivisions)

Q. No.	Questions	Marks	CO	BL
11 (a) (i)	Explain in detail about principle of midpoint circle generation algorithm with an example.	6	CO1	L3
(ii)	Using Bresenham's line drawing algorithm draw the line whose end points are (20,10) and (30,18). Tabulate all the intermediate points.	7	CO1	L4
OR				
11 (b) (i)	Explain the procedure for normalization and world to viewport transformation.	6	CO1	L3
(ii)	Clip the line L1 = (1,1) to (8,8) against the window size (2,1), (6,1),(2,7),(6,7) using Liang-Barsky line clipping algorithm.	7	CO1	L4
12 (a) (i)	For the triangle with vertices A = (5,5), B = (9,5) C = (7, 9) apply the following transformations. Mention the	13	CO2	L4

	intermediate coordinate values after each transformation: a. Move with $M_X= 5$, $M_Y =5$ b. Scale with $S_X = 0.75$, $S_Y = 0.75$ c. Reflect about x = 0 d. x direction shear $sh_x = 2$			
	OR			
12 (b) (i)	Explain in detail about solid modeling with polygonal meshes and calculate the normal of the polygon with vertices p0=(6,1,4), P1=(7,0,9) and P2=(1,1,2).	13	CO2	L4
13 (a) (i)	At which step in graphics pipeline shading is applied and explain why it has applied at that step?	6	CO3	L3
(ii)	How diffuse component of the incident light is computed?	7	CO3	L3
	OR			
13 (b) (i)	Explain in detail about z-buffer method.	6	CO3	L3
(ii)	Explain how you apply texture to an object?	7	CO3	L3
14 (a) (i)	Write in detail about NURBS.	6	CO4	L4
(ii)	Write about different types of color models and their advantages.	7	CO4	L4
	OR			
14 (b) (i)	Explain in detail the properties of Bezier cures.	6	CO4	L4
(ii)	With suitable example explain the basic ray tracing algorithm.	7	CO4	L4
15 (a) (i)	Explain in detail the development stages of animation sequence design.	13	CO6	L3
	OR			
15 (b) (i)	Explain in detail about the key-frame systems.	13	CO6	L3

PART- C (1x 15=15Marks)
(Q.No.16 is compulsory)

Q. No.	Questions	Marks	CO	BL
16.(i)	Define B-spline function and write about its useful design properties.	5	CO5	L5
(ii)	What shape does $N_{0,2}$ (t), which is the first (k = 0) B-spline function of order m = 2, have when the knots are equispaced (i.e $T = (t_0=0, t_1=1, t_2=2...)$?.	10	CO5	L6