CBCS SCHEME

22MCA251

Second Semester MCA Degree Examination, June/July 2025
Computer Graphics with Open GL

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the Digital Differential Analyzer (DDA) algorithm for line drawing. Write a pseudocode for the algorithm and discuss its efficiency compared to Bresenham's line algorithm.	10	L3	CO1
	b.	Describe the Cohen – Sutherland line clipping algorithm. How does it help in visible surface detection in 2D viewing?	10	L1	CO3
		OR			
Q.2	a.	What are the various input devices used in computer graphics? Discuss their roles and functionalities.	10	L1	CO1
	b.	Write a brief note on Open GL coordinate reference frames. How do you specify a two – dimensional world coordinate reference frame in Open GL?	10	L2	CO2
		Module – 2			
Q.3	a.	Explain the general scan line polygon fill algorithm. How does this algorithm determine which pixels should be filled for a polygon? Use a suitable diagram.	10	L2	CO2
	b.	Explain the concept of 2D composite transformation. How can these transformation be represented using matrix multiplication? Provide a detailed example.	10	L2	CO2
		OR			
Q.4	a.	Explain Inverse transformation in 2D graphics. How are they used in graphical application? Provide an example.	10	L2	CO2
	b.	What is the 2D viewing pipeline? Describe each stage of the pipeline and how open GL implements these stages.	10	L2	CO2
		Module – 3			
Q.5	a.	Describe the view point transformation in 2D graphics. How does it differ from normalization? Explain with an example.	10	L2	CO3
	b.	Describe the Sutherland – Hodgeman Polygon clipping algorithm. How does it handle the clipping of convex and concave polygon?	10	L2	CO3
		OR			

Q.6	a.	What are the RGB and CMY color models? Explain their properties and how they are used in computer graphics.	10	L2	CO3
	b.	Discuss the basic illumination models : Ambient light , diffuse reflection and specular reflection. How are these models implemented in Open GL?	10	L2	CO3
Module – 4					
Q.7	a.	Explain the 3D viewing pipeline. Describe each stage of the pipeline and how transformation are applied from world coordinates to viewing coordinates.	10	L2	CO4
	b.	Differentiate between orthogonal and perspective projections. Discuss how each projection affects the appearance of SD objects.	10	L2	CO4
OR					
Q.8	a.	What are the key Open GL functions used for 3D viewing? Explain their roles in setting up the 3D viewing environment.	10	L3	CO4
	b.	Discuss the classification of visible surface detection algorithm. How do back face detection and depth buffer methods work?	10	L2	CO4
Module – 5					
Q.9	a.	Explain the concept of Display lists in Open GL. How do Display lists improve the efficiency of rendering complex scenes? Illustrate with an example of creating and using a Display list.	10	L3	CO5
	b.	Explain the implementation of menus and picking in an interactive graphics application. What Open GL functions are used for these purpose.	10	L2	CO5
OR					
Q.10	a.	Define and describe different types of quadric surface. How can you create and render a quadric surface using Open GL functions? Provide an example.	10	L3	CO5
	b.	Discuss Bezier spline curve and surfaces. How are these used for modeling complex shapes? Include relevant Open GL functions and an example.	10	L4	CO5

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