

University of Mumbai Program: Artificial Intelligence and Data Science  
Curriculum Scheme: Rev2019  
Examination: Second Year Semester: III  
Course Code: CSC305  
Course Name: Computer Graphics

Time: 2 hours 30 mins

Max. Marks: 80

Q1. All questions compulsory 2 marks each (20 Marks)

Q1	In Homogenous Coordinate System, all Transformations are captured by
Option A	Addition
Option B	Substraction
Option C	Multiplication
Option D	Division
Q2	The anti-aliasing technique which allows shift of $\frac{1}{4}$ , $\frac{1}{2}$ and $\frac{3}{4}$ of a pixel diameter enabling a closer path of a line is _____.
Option A	filtering
Option B	pixel phasing
Option C	intensity compensation
Option D	sampling technique
Q3	What is Rasterisation ?
Option A	Technique of drawing 3D models
Option B	Video processing technique for changing the vertical / horizontal scan frequency of video signal for different purposes and applications.
Option C	Generation of photorealistic /non photorealistic images
Option D	Graphic monitor that employs CRT
Q4	The value of initial decision parameter in Bresenham's line drawing algorithm for $ m  < 1$ is _____.
Option A	$2\Delta y - \Delta x$
Option B	$2\Delta y + \Delta x$
Option C	$-2\Delta y + \Delta x$
Option D	$-2\Delta y - \Delta x$
Q5	Which of the following properties is followed by the ellipse?
Option A	4 – symmetry property
Option B	8 – symmetry property
Option C	6 – symmetry property
Option D	All of the above

Q6	Which of the following algorithms is used when we want to fill the area bounded by different color boundaries?
Option A	Boundary-fill Algorithm
Option B	Scan-line Algorithm
Option C	Flood-fill Algorithm
Option D	Seed-fill Algorithm
Q7	Consider a square with left-bottom at (2,2) and right-top at(6,6). Apply appropriate transformation to make it size double.
Option A	(4,4), (12,4),(12,12),(4,12)
Option B	(4,6), (12,4),(12,12),(6,12)
Option C	(4,6), (6,4),(12,6),(6,12)
Option D	(4,6), (6,4),(6,6),(6,4)
Q8	In Liang Barsky line clipping method, for a parallel lines, k indicates window boundary if
Option A	$P_k > 0$
Option B	$P_k < 0$
Option C	$P_k = 0$
Option D	$P_k \neq 0$
Q9	All the hidden surface algorithms employee image space approach except ?
Option A	Depth sort method
Option B	Scan line method
Option C	Depth buffer method
Option D	Back face removal
Q10	A conceptual line is drawn starting from the particular point and extending to a distance point outside the coordinate extends of the object in direction of X-axis, the line intersects twice with the polygon edges and once with the polygon vertex. Then according to inside outside test, the point lies
Option A	Outside the polygon
Option B	Inside the polygon
Option C	On the boundary of the polygon
Option D	Cannot Say

Q2. (20 Marks Each)	Solve any Four Questions out of Six	05 marks each
A	What is computer graphics? Discuss application areas in computer graphics	
B	Explain any two different antialiasing techniques in detail.	
C	Derive 2D rotation matrix about an arbitrary point	
D	Explain inside outside test used in polygon filling algorithm	
E	Prove that two successive rotations are additive	
F	What is key framing and explain character and facial animation	

Q3. (20 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	Explain Cohen Sutherland clipping algorithm. Apply the algorithm to the line with coordinates $P_1(x_1, y_1) = (2, 2)$ and $P_2(x_2, y_2) = (12, 9)$ against the window $(x_{wmin}, y_{wmin}) = (4, 4)$ and $(x_{wmax}, y_{wmax}) = (9, 8)$	
B	Given radius $r = 12$ and center coordinates $(50, 50)$ , compute the coordinates of points lying on the circle using Mid-point circle algorithm	
C	Explain, what is meant by the Bezier curve? State various properties of the Bezier curve	

Q4. (20 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	Apply Liang Barsky line clipping algorithm clip the line with coordinates $(5, 10)$ and $(35, 30)$ against the window $(X_{wmin}, Y_{wmin}) = (10, 10)$ and $(X_{max}, Y_{max}) = (20, 20)$	
B	Write a short note on a) Depth buffer b) Area subdivision method	
C	Define window, viewport and derive the equation for window to viewport transformation	