Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2021

Programme Name: B Tech CSE (All Branches) **Semester : V**
Course Name : Computer Graphics **Time : 03 hrs.**
Course Code : CSEG3003 **Max. Marks: 100**
Nos. of page(s) : 03

SECTION A

Each Question will carry 4 Marks.

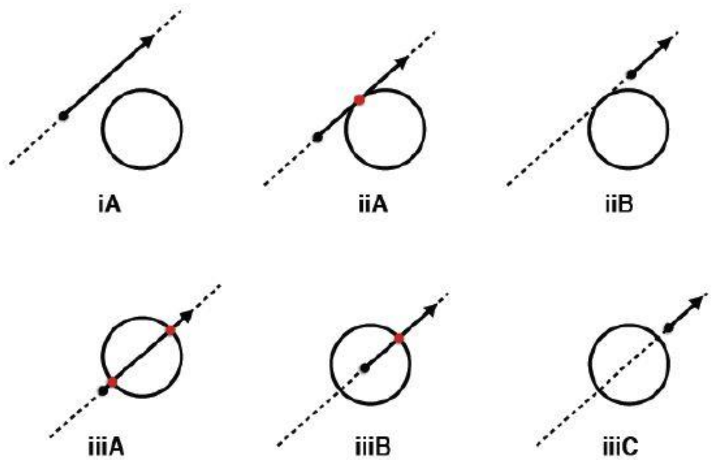
S. No.		**Marks**	**CO**
Q1	Discuss the importance of a call back function and how it is different from ordinary function. Mention four different type of call back functions along with their code snippets.	04	CO1
Q2	Explain the difference between Phong shading and Gouraud shading.	04	CO2
Q3	State the names of different color models in Computer Graphics. Illustrate any one of them briefly.	04	CO3
Q4	Demonstrate the techniques that can be used to provide text clipping in a Graphics package.	04	CO4
Q5	How much time is spent scanning across each row of pixels during screen refresh on a raster system with resolution of 1280 X 1024 and a refresh rate of 60 frames per second.	04	CO1

SECTION B

Each question will carry 10 marks.

Q6.	a) Demonstrate Cohen Sutherland line clipping algorithm. b) Apply Liang Barsky line clipping algorithm for calculating the saved portion of line from (2, 7) to (8,12) in a window (XWmin= YWmin = 5) and (XWmax = YWmax=10).	10	CO2
Q7.	Illustrate 3 dimensional homogeneous matrix to rotate by π degrees about the line passing through the point (0, 0, 0) and (1, 0, 1).	10	CO3

Q8.	Demonstrate Z buffer algorithm (do include diagrammatic representation) along-with its advantages and disadvantages.	10	CO4
	OR		
	Demonstrate the matrix representations for Reflection about X-axis, Y-axis, about the straight-line **y = x** and **y = - x** and about the origin. A mirror is placed vertically such that it passes through points (10, 0) and (0, 10). Find the reflected view of the triangle ABC with coordinates A (5, 50), B (20, 40), C (10, 70).	10	CO4
Q9.	a) Illustrate the following terminology with diagram: (**any one**) i) NURBS. ii) Fractals. iii) Knot Vector. b) Find the equation of Bezier curve which passes through (0, 0) and (-4, 2) and controlled through (14, 10) and (4, 0).	10	CO1
	SECTION-C **1. Each Question carries 20 Marks.** **2. Instruction: Write long answer.**		
Q10.	A solid tetrahedron is given by position vectors A(1,1,1) , B (3,1,1) ,C (2,1,3) and D (2,2,2) and a point light source is kept at P(2,3,4). Using Back Face detection method, find the surfaces on which light falls and the surfaces which are to be shadowed.	20	CO2
Q11.	Illustrate the solution for scan line filling algorithm for a polygon {A, B, C, D, E, F, G}. whose vertices are {(2,7) (4,12) (8,15) (16,9) (11,5) (8,7) (5,5) }. Prepare all edge tables according to scan line filling algorithm.	20	CO3
	OR		
	Find below the ways in which the ray can intersect/not intersect with the sphere. i.e., when is there exactly one intersection, when are there two intersections, and when are there no intersections. • 0 intersection points: iA, iiB, and iiiC • 1 intersection point: iiA and iiiB • 2 intersection points: iiiA	20	CO3

	 Demonstrate the algorithm along with the code snippet in OpenGL to find the intersection points or identify that there is no intersection.		