Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I (OLD course)• EXAMINATION – SUMMER 2015

Subject Code: 710202N **Date:12/05/2015**

Subject Name: Advanced Computer Graphics

Time: 10:30 am to 1:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Which is more realistic, perspective projection or parallel projection? Why? Derive an equation for perspective projection on xy plane with centre of projection on positive z-axis at a distance d.	**07**
	(b)	Explain aliasing and its effect in computer graphics. Briefly explain anti-aliasing methods.	**07**
Q.2	**(a)**	Explain Warnockôs area subdivision algorithm with example. Compare it with Weiler-Athertonôs algorithm.	**07**
	(b)	Derive the transformation matrix for oblique parallel projection. Find cavalier oblique parallel projection of pyramid with vertices A(0,0,0), B(1,0,0), C(0,1,0) and D(0,0,1). The angle between the horizontal and the projected z axis 30.	**07**
		OR	
	(b)	What are the advantages of binary space partition (BSP Tree) algorithm over other list priority algorithm? Explain BSP Tree construction with example. Also explain the BSP tree traverse algorithm to get a correct priority ordered polygon list.	**07**
Q.3	**(a)**	Explain Ray Tracing algorithm. Compare with Ray Casting.	**07**
	(b)	Derive all necessary equations for Cubic Bezier curve. Define different continuities. Derive the condition for C^1 continuity for cubic Bezier curve.	**07**
		OR	
Q.3	**(a)**	Given a unit cube with one corner at (0, 0, 0) and the opposite corner at (1, 1, 1). Represent cube as pointers to vertex list and pointers to an edge list.	**07**
	(b)	Explain the effects of multiple knots and multiple control points for B-spline curves with diagram.	**07**
Q.4	**(a)**	Compare Surface modeling and Solid modeling. Explain Polygon mesh and its representation techniques.	**07**
	(b)	(i) Why half-toning technique is required? How it can be achieved? (ii) Give applications of YIQ color model. Why we prefer YIQ model rather than RGB in color image processing?	**07**
		OR	
Q.4	**(a)**	Define polyhedral. What is the necessary and sufficient condition for object to be a polyhedron? Mention the advantages of Winged-edge representation over other boundary representation methods.	**07**
	(b)	Explain CIE chromaticity diagram. Derive the formula to translate CIE chromaticity coordinates to RGB color space.	**07**
Q.5	**(a)**	Explain Specular reflection. Derive the formula to find specular reflective component.	**07**
	(b)	The position vectors for the vertices of a triangular surface are given by A(20,0,0) , B(0,20,0) and C(0,0,20). A point light source is at P(0,0,30). Find the intensities at the vertices of the triangle if the ambient light intensity is 1 and the point light source intensity is 10. Assume Ka=Kd=0.3 and light source attenuation=1/d2.Neglet specular effect.	**07**

OR

Q.5	**(a)**	Briefly explain Gouraud and Phong shading with their merits and demerits.	**07**
	(b)	Define rendering. Compare geometry based, image based and Point based rendering techniques. Define key frame, interpolation and morphing related to animation.	**07**

****