Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2013

Subject code: 710202N **Date: 04-06-2013**

Subject Name: Advanced Computer Graphics

Time: 10.30 am – 01.00 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)**	Explain axonometric projection. Derive the transformation matrix for diametric and trimetric projection.	**07**
	(b)	Write the advantages of B-spline curve over Bezier curves. Prove that C^2 continuity is inherent in B-spline.	**07**
Q.2	**(a)**	Explain aliasing and its effect. Also explain anti-aliasing methods.	**07**
	(b)	Explain Z-buffer algorithm for visible surface detection.	**07**
		OR	
	(b)	Explain Ray tracing algorithm.	**07**
Q.3	**(a)**	Explain Warnockôs area subdivision algorithm with example. Compare it with Weiler-Athertonôs algorithm.	**07**
	(b)	ñBSP tree algorithm is useful for applications in which the viewpoint changes but the objects do notò justify the statement.	**07**
		OR	
Q.3	**(a)**	Explain the effects of multiple knots and multiple control points for B-spline curves with diagram.	**07**
	(b)	Compare image based rendering with geometry based rendering with applications of it.	**07**
Q.4	**(a)**	The position vectors of the vertices of a triangular surface are given by A(20,0,0), B(0,20,0) and C(0,0,20) and a point light source 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 K_a=K_d=0.3. Neglect specular effect.	**07**
	(b)	Explain specular reflection with an example.	**07**
		OR	
Q.4	**(a)**	Consider a triangle with coordinates A(1,2,1), B(6,2,1) and C(4,4,1). Point P in the triangle has coordinates (3,3,1). Apply phong illumination and find the intensity at point P if the light source direction L=i+k, viewing direction V=i+j+k, f_{att}=1, K_s=0.8, I_a=1, I_p=10, K_d=K_a=0.15 and n=2.	**07**
	(b)	Define foreshortening and vanishing point. Derive the formula for perspective projection on xy-plain with center of projection at distance d on positive z-axis.	**07**
Q.5	**(a)**	Explain global illumination and recursive ray-tracing algorithm.	**07**
	(b)	Explain gamma correction. Why it is required?	**07**
		OR	
Q.5	**(a)**	Explain halftone approximation with its application.	**07**
	(b)	Explain color model with CIE chromaticity diagram.	**07**

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