Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2014

Subject code: 710202N **Date: 17-06-2014**

Subject Name: Advanced Computer Graphics

Time: 02:30 pm - 05:00 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 2D rotation and 2D reflection in detail.	**07**
	(b)	Briefly explain diffuse and specular reflection. Derive the illumination equation for both. What should be the effect illumination equation if we consider light source attenuation?	**07**
Q.2	**(a)**	Explain different polygon mesh representations in detail.	**07**
	(b)	Discuss the effect of multiple control points on a uniform non-rational Bspline curve. Also discuss the effect of multiple knots on non-uniform non-rational B-spline. Draw necessary diagram in both the cases.	**07**
		OR	
	(b)	Derive the equation for Bezier surface. Find condition for C1 continuity between two Bezier surface patches.	**07**
Q.3	**(a)**	What are the differences between regularized Boolean set operations and ordinary Boolean set operations? Define regularized Boolean operations (U*,ž *,ī *) in terms of ordinary Boolean operations. Mention the properties of solid modeling techniques.	**07**
	(b)	Define- coherence. Briefly explain Z-buffer visible surface determination algorithm.	**07**
		OR	
Q.3	**(a)**	Briefly explain Back-face culling as visible surface determination algorithm. Briefly explain the role of Back-face culling to make object precision algorithm more efficient.	**07**
	(b)	List out different spatial partitioning representation methods. Briefly explain Octree.	**07**
Q.4	**(a)**	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**
	(b)	Compare Phong and Gouraud shading algorithms. Briefly explain Gouraud shading algorithm.	**07**
		OR	
Q.4	**(a)**	Why perspective projection is more realistic? Derive the perspective projection transformation matrix if projection plane at z=0 and center of projection at z=-d.	**07**
	(b)	Define: gamma correction. Explain halftone approximation in detail.	**07**
Q.5	**(a)**	Explain CIE chromaticity diagram. Derive the formula to translate CIE chromaticity coordinates to RGB color space.	**07**
	(b)	Briefly explain different types of animation and triangular wrapping method used in morphing.	**07**
		OR	
Q.5	**(a)**	Briefly explain Aliasing. Also discuss anti-aliasing techniques.	**07**
	(b)	Briefly explain Morphing and Facial animation.	**07**

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