(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

FOURTH SEMESTER [B.TECH.] MAY-2010

Paper Code: ETCS210 **Subject: Computer Graphics**
Paper Id: 32210

Time : 3 Hours **Maximum Marks :75**

Note: Attempt all questions as per internal choice is indicated.

1. Attempt *all* parts of the following: (5x5=25)
   (a) Discuss the Gourard shading model?
   (b) What is isometric projection? Discuss the generation of two vanishing points projector and its associated projections.
   (c) Why do we require the first and second order continuities in a curve? List properties of Bezier curves.
   (d) Explain the Bresenham's line drawing algorithm.
   (e) Discuss the area subdivision method.

2. Attempt any *one* part of the following: (12.5)
   (a) (i) Derive an expression for rotation about an arbitrary axis in 3D space.
   (ii) Derive the transformation matrix for scaling an object by the scaling factor S in a direction defined by the direction angles α, β, γ.
   (b) Given a triangle having vertices (x_1,y_1), (x_2,y_2) , (x_3,y_3). Find the new vertices of triangle after performing the clockwise rotation about the line $y=mx+c$.

3. Attempt any *one* part of the following: (12.5)
   (a) (i) Explain the Bresenham's algorithm for drawing a circle having centre (h, k) and radius r in the third quadrant.
   (ii) Discuss the Bezier curves for 4 points using the Bernstein polynomials.
   (b) (i) Discuss the Bezier bi-cubic surface patches.
   (ii) How does Cubic B-spline curves' using knot vectors are drawn? Give the required expressions. How do we join the curve segment?

4. Attempt any *one* part of the following: (12.5)
   (a) Discuss the Depth Sorting Method for hidden surface removal. Why is the Polygon Approximations required? Justify.
   (b) (i) Explain the terms (I) Diffused reflection (II) Ambient lighting (III) Specular reflection. Give the associated mathematical expression for these.
   (ii) Discuss the A-buffer algorithm.

5. Attempt any *one* part of the following: (12.5)
   (a) Explain the procedure of specifying an arbitrary 3D view in projections with the help of required expressions.
   (b) (i) What are the different kinds of projections? Explain perspective projection and parallel projection in detail with the help of neat diagrams.
   (ii) Discuss the rule of Boolean set operation and regularized Boolean set operations in solid modeling with examples.

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