THE LNM INSTITUTE of INFORMATION TECHNOLOGY

End Semester Exam(Summer Term-2016)

Computer Graphics (4042)

**Max Marks: 45**  **Time: 3Hrs**

**Note: 1) Do two from Q1-Q4 and Q5-Q6 are compulsory.**

**2) Draw appropriate diagram wherever required.**

Q1. A cube of side 10 is placed in 3D such that its center is located at the point (25, 25, 25). Calculate the composite transformation matrices for rotating the cube around the axis i+j+k by 600 and also calculate the vertices of the cube after the transformation. **[10]**

**OR**

Q2. A polyhedron object 40X60X200 is located at the origin. Derive the transformation matrix for obtaining an isometric projection of the object. **[10]**

Q3. You are given a line in 3D going from A(-5,4,2) to B(5, -6, 18). Project the line onto the Y=0 plane (XZ plane) when the viewer is located at (10, 10, 0).

**OR**

Q4. a) Which hidden surface algorithms are more precise image space or object space and why?

b) Show how the depth buffer method can be used to detect visible surfaces of the objects. Take necessary assumptions if required. **[3+7]**

Q5. a) Derive the shading model for a single light source using the intensity interpolations of a surface with suitable example.

b) Derive expression for the combined illumination model for ambient and diffuse reflection. **[6+4]**

Q6. a) Find the Basis functions for a fourth order open uniform cubic B-Spline curve.

b) Let four control points of a cubic Bezier curve are given as P1, P2, P3 and P4. We want to divide this Bezier curve in two curve segments, find the control points of two resultant curve segments.

c) Write basic properties of Bezier and B-Spline curves . **[6+5+4]**