

ALCCS

Code: CS40
Time: 3 Hours

Subject: COMPUTER GRAPHICS
Max. Marks: 100

AUGUST 2009

NOTE:

- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
 - **Parts of a question should be answered at the same place.**
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Q.1

- What do you understand by parametric representation of lines and curves?
- Write a short note on half-toning.
- State the merits and demerits of Cohen-Suthurland algorithm over Cyrus-Beck line clipping algorithm.
- What are isometric projections? How is concept of vanishing point linked to such projections?
- Discuss the relative merits and demerits of Z-buffer algorithm over scan line Z-buffer algorithm.
- What is the effect of changing one of the control points in the definition of a B-spline curve? State reasons for your claim.
- Define the terms:
 - Morphing
 - Key frame animation. (7 × 4)

Q.2

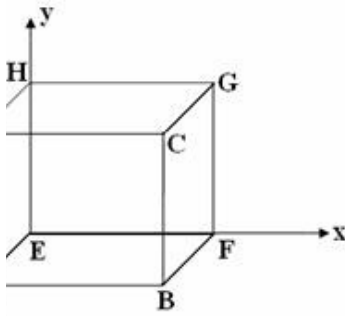
- Using integer Bresenham's algorithm indicate which pixels would be displayed to draw the line segment joining the points (2, 7) and (6, 10).
- What is a self similar fractal? Explain with examples. (9+9)

Q.3

- Using the parametric approach of Cyrus-Beck line clipping algorithm compute the visible portion of the line segment joining P(0, 40) and Q(50, 40) for the window P0(10,0), P1(20, 10) and P2(10, 50). Show all the calculations.
- Explain Phong's shading model. (12+6)

Q.4

- For the unit cube shown below, perform a perspective projection onto the $z = 0$ plane. Choose the centre of projection at $z_c = 8$ on the z -axis. Show the points on X-Y plane.



Binary Space Partitioning method for hidden surface elimination. **(10+8)**

ing algorithm for hidden surface elimination.

b. How are colors generated on a CRT screen? **(10+8)**

Q.6 a. Describe the illumination model consisting of ambient, diffusively reflected and specularly reflected components.

b. Find the cubic Bezier curve defined by the control points $P_0(10, 50)$, $P_1(10, 40)$, $P_2(40, 20)$ and $P_3(0, 0)$ as a plane curve in the $Z=0$ plane? Using the above curve as the base curve, obtain the surface of revolution by rotating the curve about the Y-axis. Draw a rough sketch of the base curve and the surface. (Show the projection of surface on $z = 0$ plane) **(9+9)**

Q.7 a. State the advantages and disadvantages of the Octree based representation of solids.

b. Find the rotation transformation matrix to make the line segment joining from $(0, 0, 0)$ to $(4, 0, 5)$ to coincide with the positive side of the Z-axis?

c. Briefly explain the circle generation method using Bresenham's algorithm. Indicate how one quarter of a circle can be generated with centre at origin and Radius R. **(4+6+8)**