[Total No. of Questions - 9]   [Total No. of Printed Pages - 3]
(2064)

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B. Tech 6th Semester Examination

Computer Graphics

CS-6002

Time : 3 Hours   **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions E. Use of non-programmable calculators is allowed.

SECTION - A

1. (a) Derive the decision parameters of Bresnham's line drawing algorithm and describe the algorithm.

   (b) Using Bresenham's line drawing algorithm, compute the coordinates of points on line between points (5, 5) and (12, 8).

   (c) Why lines inclined at angle other than ±45° or non-parallel to x-axis or y-axis appears to be zigzagged?

                                                          (8+7+5=15)

2. (a) Describe in detail scan line polygon fill algorithm.

   (b) Write short note on graphic adapter cards and monitors.
                                                          (10+10=20)

SECTION - B

3. (a) What is meant by clipping? Describe the sequence of steps involved in clipping line using mid-point sub-division line clipping algorithm.

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2   **14716**

(b) Reflect the diamond-shaped polygon whose vertices are A(−1, 0), B(0, −2), C(1, 0) and D(0, 2) about the line y=x+2.   (10+10=20)

4. (a) What do you mean by window and viewport? Describe window to viewport transformation.

(b) Describe procedure for creating, closing, deleting and renaming a segment.   (10+10=20)

SECTION - C

5. (a) Determine 3-D transformation matrix for rotation about an arbitrary axis passing through a point (x, y, z) and has (a, b, c) as direction cosines.

(b) Derive the general perspective transformation onto a plane with reference point $R_0(x_0, y_0, z_0)$, normal vector $N=n_1 I+n_2 J+n_3 K$, using C(a, b, c) as the centre of projection.   (10+10=20)

6. (a) What are orthogonal and oblique projections? Give their transformation matrices.

(b) Describe in detail method for generating Bezier and Hermite curves.   (10+10=20)

SECTION - D

7. (a) Explain Phong's method for smooth shading.

(b) Explain in detail floating horizon algorithm. (10+10=20)

8. (a) Describe Warnock algorithm for hidden surface removal.

(b) Discuss recent trends in rendering.   (10+10=20)

3   **14716**

SECTION - E

9. Give short answers of the following:

    (a)   What is the difference between raster scan displays and random scan displays?

    (b)   What is half toning?

    (c)   What are homogenous coordinates?

    (d)   How a point at infinity can be represented using homogeneous coordinates?

    (e)   Name various perspective anomalies.

    (f)   What is meant by diffuse reflection and specular reflection?

    (g)   What is meant by differential scaling? What are its effects?

    (h)   What is the need for hidden surface removal?

    (i)   In context of curve generation, what do you mean by property of local control?

    (j)   What is a frame buffer? What is its use?   (10×2=20)