Roll No. ⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛   **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech.(CSE) (2011 Onwards)   (Sem.–5)
COMPUTER GRAPHICS
Subject Code : BTCS-504
Paper ID : [A2100]

Time : 3 Hrs.   **Max. Marks : 60**

INSTRUCTION TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION A

1. **Write briefly :**

   a. What is difference between raster scan systems and random scan systems?

   b. What do you mean by persistence?

   c. Why computer generated lines which are not parallel to x-axis or y-axis and which are not inclined at $\pm 45°$ to x-or y-axis appears to be zigzagged?

   d. What is the relationship between the rotations R_Θ, $R_{-\Theta}$ and R_Θ^{-1}?

   e. Define window and viewport.

   f. What is meant by coherence? List various types of coherence techniques.

   g. Differentiate between parallel and perspective projections.

   h. What are principal vanishing points?

   i. What do you mean by anti-aliasing?

   j. What are fractals?

SECTION-B

2. Find the form of transformation matrix for reflection about a line L with slope m and y-intercept $(0, b)$.

3. Describe in detail Nicholl-Lee-Nicholl line clipping algorithm.

4. Describe in detail z-buffer algorithm for visible surface detection.

5. What are seed-fill algorithms? Write 8-connected region filling algorithm? Out of 4-connected and 8-connected seed fill algorithm, which algorithm would you use to fill 8-connected boundary region?

6. Find out the conditions under which scaling and rotation forms a commutative pair of operations.

SECTION-C

7. a. Explain in detail Midpoint algorithm for scan converting a circle.

    b. Using Midpoint circle generation algorithm, compute the coordinates of points that lie on the circumference of the circle with radius 5 and center as (7,7).

8. a. Derive the general perspective transformation onto a plane with reference point $R_0(x_0, y_0, z_0)$, normal vector $N = n_1I + n_2J + n_3K$, using $C(a,b,c)$ as the centre of projection.

    b. What are homogeneous coordinates? What role do they play in composite transformations?

9. a. Explain Gourard method for shading.

    b. Write short note on ray-tracing.