

*Time allowed : 3 hours* [Maximum marks : 80]

**Note:** Question No. - 1 is compulsory. Attempt four questions by selecting one question from each unit. All questions carry equal marks.

1. (i) What is meant by coordinate systems transformation?
- (ii) What is interlacing? State its relevance.
- (iii) What causes flickering?
- (iv) What is flood-fill algorithm?
- (v) What is raster scan?
- (vi) What are viewing coordinates? Illustrate.
- (vii) What is quadric surface?
- (viii) What is window-to viewpoint coordinate transformation? 8 × 2 = 16

## Unit - I

2. (i) What is Computer Graphics? Indicate the importance of this discipline in Computer Science by giving suitable examples. 6
- (ii) What steps are required to plot a line whose slope is between 0 and 45° using Bresenham's method? Indicate which raster locations would be chosen by Bresenham's algorithm when scan-converting a line from screen coordinate (1, 2) to screen coordinate (7, 8). 10
3. Explain the following :
  - (i) Midpoint Circle algorithm 8
  - (ii) Random Scan Systems 8

## Unit - II

4. (i) Prove that two two-dimensional rotations about the origin commute : 6  

$$R_1 R_2 = R_2 R_1$$

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(ii) What do you mean by transformation ? Describe the transformations used in magnification and reduction with respect to the origin. Find the new coordinates of the triangle P(1,1), Q(4, 3), R(0, 1) after it has been :

10

(a) Magnified thrice its size and

(b) Reduced to half its size

5

Explain the following :

(i) Cohen-Sutherland Line Clipping Algorithm 8

(ii) Cyrus-Beck Line Clipping Algorithm 8

### Unit - III

6. (i) What are Bezier surfaces ? How are these represented ? Illustrate their relevance in graphics.

8

(ii) What are polygon-rendering methods ? Which method is most popular ? Justify your answer. 8

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[P.T.O.]