

(3 Hours)

[Total Marks: 80]

N.B. : (1) Question No.1 is compulsory.

(2) Answer any three questions from Q.No. 2 to Q.No. 6

(3) Figures to the right indicate full marks

(4) Assume suitable data if required

- Q.1 a. Differentiate between Bitmap and Vector based graphics [5]
- b. Explain inside-outside test [5]
- c. Explain graphical rendering pipeline [5]
- d. Explain Java 3D [5]
- Q.2 a. Draw Bezier curve of order 3 having 4 control points (1, 1), (2,3), (4,3) and (6, 4) [10]
- b. What are the applications of Virtual Reality? [10]
- Q.3 a. Explain Cohen Sutherland line clipping algorithm. Hence find the clipping coordinates of line AB where A(-1,5), B(3,8). Window coordinates are (-3, 1) and (2,6) [10]
- b. Explain types of projections. [10]
- Q.4 a. Find coordinates of a polygon bounded by (0,0), (1,5), (6,3) and (-1,4) when reflected with respect to  $y=2x + 4$ . [10]
- b. Explain Midpoint circle drawing algorithm [10]
- Q.5 a. Explain 3D rotation with respect to arbitrary axis which is not parallel to x, y and z axis [10]
- b. Explain VRML [5]

- c. Find normalization transformation matrix in which window has lower left corner at (1,1) and upper right corner at (6,6) which is mapped to the viewport where

Viewport is a normalized device screen.

[5]

Q.6 Write short note on:

- a. Types of VR Systems
- b. Text clipping
- c. Koch curve
- d. Warping

[5]

[5]

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