

(3 Hours)

[Total Marks: 80]

**N. B. 1. Question No. 1 is Compulsory**

**2. Attempt any three questions, from the remaining five questions.**

**3. Assume suitable data if necessary and justify the assumption.**

**4. Figure to the right indicates full marks**

- |            |   |           |
|------------|---|-----------|
| <b>Q1.</b> | a) Differentiate between random scan and raster scan systems.   | <b>5</b>  |
|            | b) Compare 4-connected and 8-connected approaches for area filling illustrating the same with diagrams.   | <b>5</b>  |
|            | c) Explain 2D viewing transformation pipeline.  | <b>5</b>  |
|            | d) Prove that two successive rotations are additive in 2D transformation.   | <b>5</b>  |
| <b>Q2.</b> | a) Explain the steps for 2D scaling about a fixed point and also derive a composite transformation matrix for the same.   | <b>10</b> |
|            | b) Explain DDA line drawing algorithm and use the same to plot the points for line AB where A (15, 15) and B (25, 20).  | <b>10</b> |
| <b>Q3.</b> | a) Clip the line AB where A(5,15), B(15,12) using the Liang Barsky line clipping algorithm where window coordinates are given as (Xmin,Ymin)= (10,10) and (Xmax,Ymax)= (20,20). | <b>10</b> |
|            | b) Explain Sutherland – Hodgeman Polygon Clipping algorithm with suitable example.  | <b>10</b> |
| <b>Q4.</b> | a) Write a midpoint circle drawing algorithm and use the same to plot a circle with radius=10 and center at (20, 20).   | <b>10</b> |
|            | b) Write a short note on constructive solid geometry and sweep representations.   | <b>10</b> |
| <b>Q5.</b> | a) What is meant by parallel and perspective projection? Derive matrix for perspective projection.  | <b>10</b> |
|            | b) Explain various anti-aliasing techniques.  | <b>10</b> |
| <b>Q6.</b> | Write a short note (any four).  | <b>20</b> |
|            | a) Depth Buffer Method  |           |
|            | b) Phong shading  |           |
|            | c) Scan-line method   |           |
|            | d) B-Spline Curve   |           |
|            | e) Koch Curve   |           |

\*\*\*\*\*