

[Duration: Three Hours]

[Marks: 80]

1. Question No. 1 is **compulsory**.
2. Attempt **any three** questions **from remaining five** questions.
3. **Assume suitable data wherever required** with proper **justification**.
4. Answers should be supplemented by **neat sketches, wherever possible**.

Q.1 Explain the following: **(20)**

- a) Explain B-rep and CSG type solid modeling with example.
- b) Application of finite element analysis.
- c) Color Model.
- d) Parallel Projection.

Q.2

- a) Use the Bresenham's algorithm to rasterize the line from (6,6) to (14,10). **(10)**
Also plot the pixel positions.
- b) Write short note on windowing and clipping. Explain Cohen Sutherland algorithm for line clipping **(10)**

Q.3

- a) A triangle formed by three points A,B,C whose coordinates are A(50,40), B(100,60), C(70,80) Calculate the new coordinates if the triangle is reduced in size using the scale factor $S_x=0.5, S_y=0.7$ and the base point is A. **(10)**
- b) What is product data exchange? Enlist different data exchange formats available and explain any one in details. **(10)**

Q.4 Find out transformation matrix to align vector $V=2i+3j+k$ with vector K **(20)**

Q.5

- a) Construct the Bezier curve of order 3 and with polygon vertices A(1,1), B(2,3), C(4,3), D(6,4). **(10)**
- b) Explain flood fill algorithm for polygon filling. **(10)**

Q.6 Explain the following:

(20)

- a) Effects of scan conversion.
- b) Shading Model.
- c) Properties of Bezier and B-Spline curve.
- d) Raster scan graphics.
