

**II B.Tech II Semester Supplementary Examinations,  
November/December 2005  
COMPUTER GRAPHICS  
(Mechatronics)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions  
All Questions carry equal marks**

\*\*\*\*\*

1. (a) Illustrate the applications of computer graphics.  
(b) What is the stair-case effect in line generation? [8+8]
2. Explain the scan-line algorithm for polygon filling. [16]
3. Explain the following:  
(a) Shear transformations  
(b) Image transformations. [8+8]
4. Write procedures for creating and closing segments. [16]
5. Explain the following:  
(a) Generalised clipping  
(b) Multiple windowing. [8+8]
6. Derive transformation matrices for  
(a) Parallel projection  
(b) Perspective projection. [8+8]
7. (a) Explain the basic concepts of hidden surfaces and line removal methods with suitable examples.  
(b) Write about z-buffers. [10+6]
8. (a) Describe the properties of B spline approximations.  
(b) What is the difference between Bezier curve and B-spline curve? [10+6]

\*\*\*\*\*

**II B.Tech II Semester Supplementary Examinations,  
November/December 2005  
COMPUTER GRAPHICS  
(Mechatronics)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions  
All Questions carry equal marks**

\*\*\*\*\*

1. Explain the following briefly
  - (a) Raster scan graphics display
  - (b) Vector refresh display [8+8]
2. (a) Explain the role of display interpreter in graphical display, with a block diagram.  
(b) What is meant by normalized device co-ordinate system? What are its advantage? [6+10]
3. Give 3x3 homogeneous-coordinate transformation matrix which will have the same effect as each of the following transformation techniques:
  - (a) Scale the image to be twice as large and then rotate counter-clockwise by 90 degrees about the origin.
  - (b) Rotate clockwise about the origin by 45 degrees and then scale the y-direction to be one-half as large. [8+8]
4. (a) Derive viewing transformation matrix.  
(b) Write a procedure for delete-all-segments [10+6]
5. What is line segment clipping? Describe the various clipping categories into which the line segments are categorized. What is the significance of each category? [16]
6. Explain about the following 3D transformations:
  - (a) Scaling
  - (b) Translation
  - (c) Rotation about x-axis [16]
7. Write about the following:
  - (a) 3D clipping
  - (b) Shading algorithms [8+8]
8. (a) Write about pipeline and parallel front end architecture.  
(b) Explain about Bezier curves. [8+8]

\*\*\*\*\*

**II B.Tech II Semester Supplementary Examinations,  
November/December 2005  
COMPUTER GRAPHICS  
(Mechatronics)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions  
All Questions carry equal marks**

\*\*\*\*\*

1. (a) Explain the features of Bresenham's line drawing algorithm.  
(b) Mention the applications of computer graphics. [8+8]
2. (a) Briefly explain the steps involved in flood-fill algorithm.  
(b) Distinguish flood-fill and scan-line algorithms for polygon filling. [8+8]
3. (a) How the magnification and reduction of the graphical objects is done.  
(b) Derive the composite transformation matrix which magnifies an object by 's' units in x and y directions about its center c(h,k). [8+8]
4. (a) What is the utility of segments? Explain the use of segment table for organizing information about the segments.  
(b) What are the various data structures that are used for storing segments? Comment on their relative merits and demerits. [16]
5. What is line segment clipping? Describe the various clipping categories into which the line segments are categorized. What is the significance of each category? [16]
6. (a) Give a brief account on three-dimensional rotations.  
(b) Show the sequence of transformations for rotating an object about an axis that is parallel to the x axis [6+10]
7. Write about the following:  
(a) 3D clipping  
(b) Shading algorithms [8+8]
8. (a) Write about pipeline and parallel front end architecture.  
(b) Explain about Bezier curves. [8+8]

\*\*\*\*\*

**II B.Tech II Semester Supplementary Examinations,  
November/December 2005  
COMPUTER GRAPHICS  
(Mechatronics)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions  
All Questions carry equal marks**

\*\*\*\*\*

1. (a) What is the difference between simple DDA and Bresenham's line generation algorithm?  
(b) Explain how dotted lines can be drawn.  
(c) What is the method of producing a thick line segment? [4+4+8]
2. (a) Using the syntax of display file structure, write the algorithm to put an instruction into the display file.  
(b) Explain the role of display file in the graphical image generation. [8+8]
3. Describe the transformation that rotates an object point  $Q(x,y)$ ,  $\theta$  degrees about an arbitrary point. [16]
4. Explain the following terms with reference to 2-D displays:  
(a) Viewing transformation  
(b) Windows and view ports [16]
5. Explain the following:  
(a) Generalised clipping  
(b) Multiple windowing. [8+8]
6. Explain briefly the transformation steps for obtaining a composite matrix for rotation about an arbitrary axis with the rotation axis projected on to the z-axis [16]
7. Outline the z-buffer algorithm. List the advantages and disadvantages of the z-buffer algorithm. [16]
8. Give the advantages and disadvantages of hard copy displays, vector refresh displays and raster displays. [16]

\*\*\*\*\*