Code No: RR420306 **Set No. 1**

**IV B.Tech II Semester Regular Examinations, Apr/May 2006**
**COMPUTER GRAPHICS**
**( Common to Mechanical Engineering and Production Engineering)**
**Time: 3 hours** **Max Marks: 80**

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

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1. (a) Explain an algorithm for ellipse generation.
   (b) If a TV screen has 525 scan lines and an aspect ratio of 3:4,and if each pixel contains 8 bits worth of intensity information, how many bits per second are required to show 30 frames each second? [12+4]
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) Prove that the scaling transformations commute; that is, S1× S2 = S2× S1.
   (b) Prove that the 2-D rotations about the origin commute; that is, R1×R2 = R2×R1. [8+8]
4. Derive the window-to-view port transformation equations by first scaling the window to the size of the view port and then translating the scaled window to the view port position. [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. (a) Describe the properties of B spline approximations.
   (b) What is the difference between Bezier curve and B-spline curve? [10+6]

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Code No: RR420306 **Set No. 2**

**IV B.Tech II Semester Regular Examinations, Apr/May 2006**
**COMPUTER GRAPHICS**
**( Common to Mechanical Engineering and Production Engineering)**
**Time: 3 hours** **Max Marks: 80**

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

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1. (a) Explain an algorithm for ellipse generation.
   (b) If a TV screen has 525 scan lines and an aspect ratio of 3:4,and if each pixel contains 8 bits worth of intensity information, how many bits per second are required to show 30 frames each second? [12+4]
2. (a) Briefly explain the steps involved in scan-line algorithm for polygon filling.
   (b) What are the merits and demerits of flood-fill and scan-line algorithms?[10+6]
3. Explain the following:
   (a) Shear transformations
   (b) Image transformations. [8+8]
4. Write procedures for creating and closing segments. [16]
5. Explain the Cohen-Sutherland algorithm for finding the category of a line segment. Show clearly how each category is handled by the algorithm. [16]
6. Prove that any two successive 3-D rotations about a given rotation axis is commutative. [16]
7. Explain the following:
   (a) Painter's algorithm
   (b) Warnock's algorithm. [8+8]
8. Describe Bezier surface generation technique with examples. [16]

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Code No: RR420306 **Set No. 3**

**IV B.Tech II Semester Regular Examinations, Apr/May 2006**
**COMPUTER GRAPHICS**
**( Common to Mechanical Engineering and Production Engineering)**
**Time: 3 hours** **Max Marks: 80**

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

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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. Explain the following:
   (a) world, screen and normalised cordinates.
   (b) 2D graphics primitives. [8+8]
3. Give 3x3 homogeneous-coordinate transformation matrix which will have the same effect as each of the following transformation techniques:
   (a) Translate down 1 unit and right 1 unit , and then rotate counter-clockwise by 45 degrees.
   (b) Scale the y coordinate to make the image twice as tall, shift it down 1 unit rotate clockwise by 30 degrees. [8+8]
4. Find the normalization transformation that maps a window whose lower left corner is at (1,1) and upper right corner is at (3,5) onto
   (a) a view port that is the entire normalized device screen and
   (b) a view port that has the lower left corner at (0,0) and upper right corner at (1/2,1/2). [16]
5. Explain the Cohen-Sutherland algorithm for finding the category of a line segment. Show clearly how each category is handled by the algorithm. [16]
6. Explain the method to derive the transformation matrix for rotating an object about any arbitrary axis. [16]
7. Outline the z-buffer algorithm. List the advantages and disadvantages of the z-buffer algorithm. [16]
8. (a) Write about pipeline and parallel front end architecture.
   (b) Explain about Bezier curves. [8+8]

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Code No: RR420306 **Set No. 4**

**IV B.Tech II Semester Regular Examinations, Apr/May 2006**
**COMPUTER GRAPHICS**
**( Common to Mechanical Engineering and Production Engineering)**
**Time: 3 hours** **Max Marks: 80**

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

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1. (a) Explain the concepts of aliasing and antialiasing. How can the effects of aliasing be minimized?
   (b) Write short notes on frame buffer. [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. Describe the transformation that rotates an object point Q(x,y), $\theta$ degrees about an arbitrary point. [16]
4. Find the normalization transformation that maps a window whose lower left corner is at (1,1) and upper right corner is at (3,5) onto
   (a) a view port that is the entire normalized device screen and
   (b) a view port that has the lower left corner at (0,0) and upper right corner at (1/2,1/2). [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. Explain the following:
   (a) 1-Point, 2-point perspective projections.
   (b) Viewing parameters. [8+8]
7. Explain the following:
   (a) Painter's algorithm
   (b) Warnock's algorithm. [8+8]
8. Explain the process of generating curves and surfaces using
   (a) Hermite method
   (b) B-spline method. [8+8]

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