Code No: RR311203 **Set No. 1**

III B.Tech I Semester Regular Examinations, November 2005
COMPUTER GRAPHICS
(Common to Information Technology and Electronics & Computer 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 role of following components in a CRT device.
   i. Control grib
   ii. Focusing system.
   iii. Accelerating a node
   iv. Horizontal and vertical deflection plates.
   (b) Discuss about the characteristics of direct view storage tube (DVST) devices. [8+8]
2. (a) Discuss the steps involved in the ordered edge list algorithm.
   (b) What are the advantages of edge flag algorithm. [8+8]
3. (a) Distinguish between geometric transformations and coordinate transformations.
   (b) Describe the transformation using symbolic notations, that rotates an object point Q (x,y), θ degrees about a fixed center of rotation P(h,k). [8+8]
4. Explain the steps involved in the following line clipping algorithms:
   (a) Mid-point subdivision algorithm.
   (b) Cohen-Sutherland outcode algorithm. [8+8]
5. Drive the matrix form for the geometric transformations in 3-D graphics for the following operations.
   (a) Translation
   (b) Scaling
   (c) Mirror reflections. [5+5+6]
6. Classify the shading algorithms. Explain the principle followed in each of the algorithms. Discuss their merits and demerits. [16]
7. (a) Prove that a Bezier curve in the plane is axis independent.
   (b) Demonstrate that B-spline curve follows local control. [8+8]
8. (a) What is meant by animation? Explain.
   (b) Discuss the characteristics of key-frame animation. [8+8]

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Code No: RR311203 **Set No. 2**

III B.Tech I Semester Regular Examinations, November 2005
COMPUTER GRAPHICS
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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Design a frame buffer for the color graphics display where 3 bits of memory is allocated per color per pixel.
   (b) If the resolution of the video display unit is 540×480, how much frame buffer memory is needed to design the above frame buffer. [8+8]
2. (a) Explain how the area antialiasing technique is implemented?
   (b) Distinguish between antialiasing and halftoning. [8+8]
3. (a) What is meant by homogeneous representation of transformation matrices. Why it is necessary.
   (b) List the homogeneous representation of all the basic transformations.
   (c) Find the transformation matrix that represents rotation of an object by 30^0 clock wise, about the origin. [5+5+6]
4. (a) Explain the terms: world coordinate system, normalized device coordinate system and physical device coordinate system.
   (b) Explain the procedure followed to determine whither a line segment is intersection a given vector or not. [8+8]
5. Derive the transformation matrix for aligning the vector V =I+J+K with the vector K. [16]
6. (a) What is minimax text used in z-buffer algorithm? When the mini-max test fails?
   (b) In the depth buffer algorithm, how many bite must allocated to each entry in depth array and inframe buffer. [8+8]
7. Discuss about different color systems. [16]
8. (a) Discuss the procedural control methods of animation.
   (b) What are the advantages of procedural control over full explicit control. [8+8]

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Code No: RR311203 **Set No. 3**

III B.Tech I Semester Regular Examinations, November 2005
COMPUTER GRAPHICS
(Common to Information Technology and Electronics & Computer 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 role of following components in a CRT device.
   i. Control grib
   ii. Focusing system.
   iii. Accelerating a node
   iv. Horizontal and vertical deflection plates.
   (b) Discuss about the characteristics of direct view storage tube (DVST) devices. [8+8]

2. (a) Briefly explain about different image compression techniques.
   (b) Explain the steps involved in simple parity scan conversion algorithm. [10+6]

3. (a) Prove that the multiplication of two successive scaling matrices are commutative.
   (b) Show that two successive reflections about either of the coordinate axis is equivalent to the original input object. [8+8]

4. (a) Explain the terms: world coordinate system, normalized device coordinate system and physical device coordinate system.
   (b) Explain the procedure followed to determine whither a line segment is intersection a given vector or not. [8+8]

5. The vector V is defined as $V = a_1I + b_1J + c_1K$ and vector N is defined as $N = a_2I + b_2J + c_2K$. Find the transformation $A_{v,n}$ which aligns the vector V with the vector N. [16]

6. (a) Discuss the steps involved in computation of surface normal at a vertex when
   i. the plane equations of surrounding polygons in given and
   ii. the coordinates of vertices are given.
   (b) Discuss how the Mach-band effects are eliminated in Phong shading. [4+4+8]

7. (a) What is the blending function used in Bezier's method for curve generation? Explain the terms involved in it?
   (b) What are the properties of Bezier curve? [10+6]

8. Describe the following rules of animation in detail:

(a) Squash and stretch

(b) Slow-in and Slow out. [8+8]

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Code No: RR311203 **Set No. 4**

III B.Tech I Semester Regular Examinations, November 2005
COMPUTER GRAPHICS
(Common to Information Technology and Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the functioning of Raster Graphics System.
   (b) Consider a raster system with resolution of 1280 × 1024. How many pixels could be accessed per second by a display controller that refreshes the screen at a rate of 60 frames per second. What is the access time per pixel? [8+8]
2. (a) Explain the significance of the variable e = m-0.5 in Bresenham's algorithm.
   (b) Does the Bresenham's algorithm generates the same points as the simple DDA? Justify your argument. [6+10]
3. (a) What is meant by composite transformations
   (b) Write the general form of a scaling matrix with respect to a fixed point P(h,k) where the scaling factors in x and y directions are a and b respectively. [6+10]
4. (a) Explain the line-clipping algorithm using mid-point sub-division approach.
   (b) How the stack size and length of the line segment are related in the context of mid-point subdivision algorithm?
   (c) Explain how the visibility test is performed with respect to a given vector. [8+4+4]
5. Find the transformation matrix which aligns the vector V=I+J+K with the vector N 2I-J-K. [16]
6. (a) What are the advantages of mini max test in z-buffer algorithm?
   (b) A polygon has a plan equation ax + by + cz + d = 0. Suppose that we know the value of 'z' at a point (x, y). What is the easiest way to calculate the value of z at (x + 1,y) and at (x, y + 1)? [8+8]
7. (a) State blending function used in B-spline curve generation. Explain the terms involved in it.
   (b) What are the properties of B-spline curves? [10+6]
8. Describe the following rules of animation in detail:
   (a) Squash and stretch
   (b) Slow-in and Slow out. [8+8]

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