

(Please write your Roll No. immediately)

Roll No.

End-Term Examination

Second Semester [MCA] – MAY-JUNE 2006

Paper Code: MCA-108
Paper ID : 44108

Subject: Computer Graphics

Time: 3 Hours

Maximum Marks: 60

Note: Section-A is compulsory. Attempt any three question from section-B

- Q. 1 Describe the following in brief :- (3 x 5 = 15)
- (a) QUADRATIC SURFACES
 - (b) RGB Color Models.
 - (c) BSP Tree
 - (d) Solid Modeling
 - (e) Principal Vanishing Point
- Q. 2
- (a) What is the advantage of using homogenous coordinates? Consider the square (0,0), (0,2), (2,0), (2,2). Perform a composite transformation of the square by using the following steps. (Give the coordinates of the square at each intermediate steps.)
 - (i) Scale by using $S_x = 2$ and $S_y = 3$.
 - (ii) Rotate of 45° in the anticlockwise direction.
 - (iii) Translate by using $T_x = 3$ and $T_y = 5$. (6)
 - (b) Describe B-Splines and their application in detail. (4)
 - (c) What do you understand by intensity interpolation? Explain Gouraud shading. (5)

SECTION -B

- Q. 3
- (a) Discuss Bresenham's Circle Drawing algorithm. Trace the algorithm to determine first TEN points of the circle $x^2 + y^2 = 25$. (6)
 - b) Discuss Z-Buffer algorithm in detail. (4)
- Q. 4
- (a) Define Scissoring Process. Describe Cohen-Sutherland Line Clipping algorithm in details. (6)
 - (b) Write the empirical model for calculating specular reflection range given in the Phong Model. (4)
- Q. 5
- (a) Determine the Bezier Curve with four control points. Discuss the importance of Bernstein Polynomials. (10)

- Q. 6 (a) Discuss Julia Set and Mandelbrot set. (5)
- (b) Why are hidden surface algorithm needed? Explain Oct-trees method for visible surface determination. (5)
- Q. 7 (a) What are the applications of fractals in computer generated graphics? (3)
- (b) How can sweeps be used for solid modeling? Discuss their limitations and possible methods to overcome these. (5)
- (c) What is Ray Tracing? (2)
- Q. 8 (a) How can a 3-D object be viewed by human eyes? Differentiate between different method? (4)
- (b) If you were an architect and needed to determine the dimensions of an object, which projection would you use and why? Classify these projections. (6)

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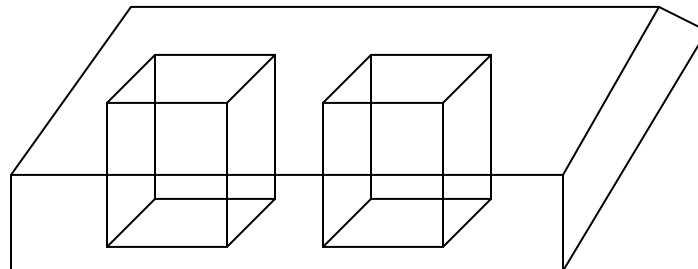
Subject: Computer Graphics

Time: 3 Hours

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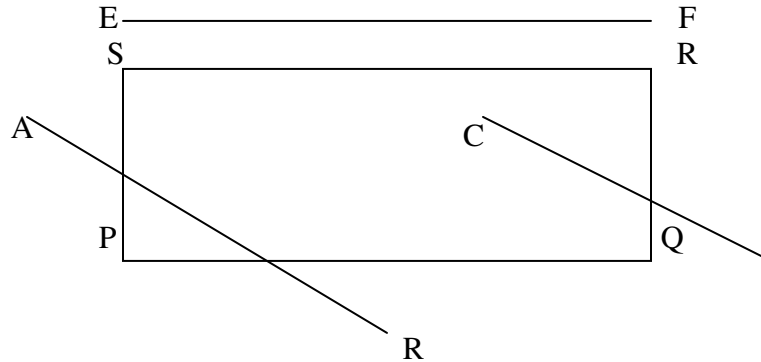
Note: Q. 1 is compulsory. Attempt one question from each unit.

- Q. 1
- (a) What is scan conversion? 1
 - (b) What do you mean by persistence? 1
 - (c) What is aspect ratio? How do we calculate it? 1½
 - (d) What are two difference methods for producing color display with CRT? 1
 - (e) What do you mean by homogeneous co-ordinate? Give example. 1½
 - (f) Give difference between parametric continuity and geometric continuity. 1½
 - (g) Define vanishing points. 1½
 - (h) Enumerate various types of parallel projections. 2
 - (i) What do you mean by centre of projection. 1
 - (j) Write the generalized Euler's formula and verify it for 2



- (k) Give an example of CSG. 2
 - (l) Write rotation matrices for rotation in 3D about the coordinate axis. 3
 - (m) Why do we use parametric representation of curves? 1
- Q. 2 Describe the rotation of an object about an axis A, which is not parallel to any of the three co-ordinate axis of the co-ordinate system. 10

- Q. 3 Describe Sutherland-cohn clipping algorithm. Hence, clip the lines AB, CD and EF with respect to rectangle/ window PQRS. 10



UNIT – II

- Q. 4 (a) Derive the basics matrix for cubic Bezier curve. Give also the corresponding Bernstein Polynomials. 8
 (b) What are conditions for smoothly joining the two Bezier curve segment. 2
- Q. 5 (a) What do you mean by knot (values) in B-splines. Define the various types of knot vectors and give the effect of such knot vectors on the shape of the curve. 6
 (b) Describe a method of scan conversion of a curve. 4

UNIT – III

- Q. 6 (a) What do you mean by parallel projection and perspective projection? 2
 (b) Drive a matrix for the projection of a point $p(x, y, z)$ onto a projection plane at a distance Z_p from the origin and perpendicular to z -axis. 8
- Q. 7 (a) What are the various ways of representing solids? Describe briefly the properties of solid representation scheme. 6
 (b) Describe one hierarchical representation scheme. 4

UNIT – IV

- Q. 8 (a) Describe specular reflection model and the computation of reflection vector. 2½
 (b) What are difference(s) between Gouraud and Phong shading. 2½
 (c) Write the pseudocode for z -buffer algorithm. 5
- Q. 9 Describe the steps of Depth-sort algorithm. 10

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End-Term Examination

Third Semester [MCA] – DECEMBER 2004

Paper Code: MCA-207

Subject: Computer Graphics

Time: 3 Hours

Maximum Marks: 60

Note: Attempt any five questions.

- Q. 1 (a) Explain Bresenham's line drawing algorithm. Give the advantages of this algorithm over DDA algorithm. 7
(b) Compute the intermediate prints on the line drawn from (0,0) to (5, 10) using Bresenham's algorithm. 5
- Q. 2 (a) Explain Cyrus-Beck parameter line clipping algorithm. 6
(b) Compute coordinate of points of circle drawn with centre at (0,0) and radius 6, using mid point circle algorithm. 6
- Q. 3 (a) Define window to viewport transformation. 6
(b) Compute 2D transformation matrix for rotating a point (12, 6) about the point (3, 2) by an angle 30° in clockwise direction. 6
- Q. 4 (a) Explain YIQ color model. How it can be obtained from RGB model? and why is it used in commercial color television broadcasting? 6
(b) Explain the design and working of a color shadow marks CRT. 6
- Q. 5 (a) Give the comparison of Gourands Phoring Shading Techniques. 6
(b) Explain 2 buffer algorithm per hidden surface removal. 6
- Q. 6 (a) Write a program to display parametric cubic curves using forward differences and recursive sub division. 6
(b) Explain principle of working of Roster Scan display system. 6
- Q. 7 (a) Explain Multipass Transformation and its application in image processing. 7
(b) What is image filtering? Why is it required? 5
- Q. 8 Write notes on any two :-
(a) Solid modeling (b) Volume Rendering (c) Fractul models. 12
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End-Term Examination

Third Semester [MCA] – MAY 2003

Paper Code: MCA-207

Subject: Computer Graphics

Time: 3 Hours

Maximum Marks: 60

Note: Attempt any six questions.

- Q. 1 (a) Explain in detail the Bresenham's circle algorithm. 5
(b) Consider the line from (0, 0) to (-8, -4) in the third quadrant. Evaluate the steps in the DDA algorithm. 5
- Q. 2 (a) Derive the window to viewpoint transformation. 5
(b) Derive the transformation for parallel projection. 5
- Q. 3 Determine the blending function for uniform, periodic B-spline curves for $d=3$, $n=3$. 10
- Q. 4 A point (10, 10) is to be reflected about a line, $y= 2x$ in 2-D. Find out the coordinate of the reflected point. 10
- Q. 5 (a) Find out a composite matrix for scaling in 2D about an arbitrary point (X_0, Y_0) . The scaling parameters are S_x & S_y 5
(b) What is modeling? What are the approaches to achieve a model? 5
- Q. 6 (a) Write Sutherland-Hodgman Polygon clipping algorithm. 7
(b) Explain the term transparency used in computer graphics. 3
- Q. 7 Derive a composite matrix for reflection about the line $y = x$ in 2-D. 10
- Q. 8 Describe the working principle of LCD displays? What are there advantages over CRT displays? What are their applications? 10
- Q. 9 What do you understand by Projection? What are the various prospective projection anomalies? 10
- Q. 10 Explain the following terms :- 10
(a) GKS
(b) Structure of display file
(c) Raster scan
(d) Transformation
(e) Function set design.
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End-Term Examination

Third Semester [MCA] – DECEMBER 2002

Paper Code: MCA-207

Subject: Computer Graphics

Time: 3 Hours

Maximum Marks: 60

Note: Attempt any six questions. Q. 1 is compulsory.

- Q. 1 Describe the following in brief :- 2 x 10
- (a) Clipping
 - (b) Locator Devices
 - (c) Addressability and Resolution
 - (d) QUADRIC Surface
 - (e) JPEG
 - (f) RGB color Mode
 - (g) Octress
 - (h) Special Effects with Images
 - (i) Particle system
 - (j) Thermal transfer printer.
- Q. 2 (a) Discuss ONE method to scan-convert an ellipse. 4
(b) Why do you need clipping? Discuss Cohen- Sutherland algorithm for line clipping in detail. 4
- Q. 3 (a) Discuss the functioning of a typical Video Processor. 4
(b) How and why do you achieve Window-to-viewport transformation? 4
- Q. 4 (a) It is easier to locate hidden surface with parallel projection. Explain you agreement or disagreement with the statement. 4
(b) What is meant by Hermite, Bezier and Spline Curves? Explain any one of these curves. Explain any one of the curve in detail. 4
- Q. 5 (a) What do you understand by Ray Casting? Explain one method of ray casting. 5
(b) Discuss problems associated with Interpolated- shading of objects. 3

- Q. 6 (a) What do you understand by Transparency? Describe all classes of transparencies you have studied. 4
- (b) Discuss important efficiency considerations to be made while pursuing Recursive Ray Tracing. 4
- Q. 7 (a) Define the term image, Filtering and Image Processing. 4
- (b) What do you understand by Image composition? Explain one method of image composition. 4
- Q. 8 (a) Describe at least one method of modeling a natural object. 4
- (b) Explain multi-pass transformation. 4
