



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Third Semester - Master of Computer Applications (MCA)

Semester End Examination; Dec. - 2015

Computer Graphics

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

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|------|---|----|
| 1 a. | Write an OpenGL Program to create a square. | 10 |
| | b. Write digital differential analyzer line drawing algorithm. Trace the algorithm with the end points (2, 3) and (8, 8). | 10 |
| 2 a. | What are the different methods of identifying concave polygon? Demonstrate vector method for splitting concave polygon with an example. | 10 |
| | b. Explain odd - even rule for inside – outside test. | 5 |
| | c. Explain boundary - fill algorithm in brief. | 5 |

UNIT - II

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|------|---|----|
| 3 a. | Prove that a uniform scaling and a rotation form a commutative pair of operations but that, in general, scaling and rotation are not commutative operations. | 10 |
| | b. Show that the transformation matrix for a reflection about the line $y = x$ is equivalent to a reflection relations to x - axis followed by a clockwise rotation of 90 degree. | 5 |
| | c. Explain two dimensional shear transformation. | 5 |
| 4 a. | Explain three dimensional translation, scaling and rotation transformations. | 10 |
| | b. Explain the sequence of transformation for rotating a three dimensional object about an axis that is parallel to one of the co-ordinate axis. | 10 |

UNIT - III

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|------|--|----|
| 5 a. | What is clipping? Explain Liang – Barsky line clipping algorithm. | 10 |
| | b. Using Cohen – Sutherland algorithm clip the line segment A (-4, 2) and B (-1, 7) in a window defined by left bottom corner at (-3, 1) and upper right corner at (2, 6). | 10 |
| 6 a. | Explain Sutherland – Hodgmon Polygon Clipping algorithm with an example. | 10 |
| | b. Write short notes on : | |
| | i) Curve clipping | 10 |
| | ii) Text clipping. | |

UNIT - IV

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|------|---|---|
| 7 a. | Define projection, depth cueing and surface rendering in three dimensional viewing. | 6 |
| | b. Discuss three dimensional transformation pipeline in detail. | 6 |

- c. Explain the three dimensional transformation from world to viewing Co-ordinates. 8
- 8 a. Demonstrate parallel and perspective projections by projecting a line segment on to a view plane. Explain briefly. 10
- b. Explain the following :
 - i) Orthogonal projection 10
 - ii) Oblique parallel projections.

UNIT - V

- 9 a. What is Bezier spline curve? Derive an equation for Bezier curve. 10
- b. Discuss the properties of Bezier curves. 5
- c. Explain Cubic Bezier Curves in detail. 5
- 10 a. What is computer animation? Explain the basic approach to design an animation sequence. 10
- b. List and explain traditional animation techniques. 5
- c. Explain double buffering method for producing a real - time animation with a raster system. 5

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