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

(An Autonomous Institution affiliated to VTU, Belagavi)

Third Semester, Master of Computer Applications (MCA)

Semester End Examination; Dec - 2017/Jan - 2018

Computer Graphics

Time: 3 hrs

Max. Marks: 100

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

### UNIT - I

- 1 a. Write an OpenGL program to create a right angled triangle. 10
- b. Write Bresenham's line drawing algorithm. Trace the algorithm to draw a line with end points (1, 1) and (8, 5). 10
- 2 a. Write midpoint ellipse generation algorithm. Explain briefly. 10
- b. Explain general scan-line polygon-fill algorithm in brief. 5
- c. Discuss the rational method for splitting a concave polygon into a set of triangles. 5

### UNIT - II

- 3 a. Explain general two dimensional fixed-point scaling and derive the composite matrix. 5
- b. Transform the given square ABCD to half its size with center still remain at the same position. The coordinates of the square are A (1, 1), B (3, 1), C (3, 3), D (1, 3) and center at (2, 2). Find the coordinates of the square after the transformation. 5
- c. Explain: i) Shear transformation ii) Reflection iii) Two-Dimensional inverse transformation. 10
- 4 a. Explain OpenGL Geometric-transformation functions. 6
- b. What is affine transformation? Explain. 4
- c. Explain three dimensional translation, scaling and rotation transformations. 10

### UNIT - III

- 5 a. Explain the terms window and viewport. Discuss two dimensional viewing-transformation pipelines. 10
- b. Explain 2D normalization and viewport transformation matrix. 10
- 6 a. Explains Cohen-Sutherland clipping algorithm. 10
- b. Explain Sutherland-Hodgman polygon clipping algorithm with an example. 10

### UNIT - IV

- 7 a. Explain Three dimensional viewing coordinate parameter. 10
- b. Illustrate the steps to obtain perspective projection transformation coordinates. 10
- 8 a. Explain Orthogonal Projection in detail. 10
- b. Demonstrate parallel and perspective projections by projecting a line segment on to a view plane. Explain briefly. 10

UNIT - V

- 9 a. Explain Bezier curve and its equation with example. 10
- b. Discuss the properties of Bezier curves. 5
- c. Explain general computer animation functions. 5
- 10 a. What is computer animation? Explain the basic approach to design an animation sequence. 10
- b. Explain the following :
  - i) Traditional animation techniques 10
  - ii) Generating animations using raster operations.

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