Course Code : CST 319 **KOLP/RW – 19 /9543**

Sixth Semester B. E. (Computer Science and Engineering) Examination

COMPUTER GRAPHICS AND GUI DESIGN TECHNOLOGIES

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) Each question carries marks as indicated.
(2) Due credit will be given to neatness and adequate dimension.
(3) Assume suitable data and illustrate answers with the neat sketches wherever necessary.
(4) Use graph paper wherever necessary to illustrate the answer.

1. (a) Compute the pixels on the line segment from $(0, 0)$ to $(5, -6)$ using DDA algorithm. Which pixels are activated for the dotted line ? 5(CO1 , CO2)

(b) Rasterize a circle with centre $(2, 2)$ and radious 7 in the first quadrant using Bresenham's algorithm. 5(CO1 , CO2)

OR

(c) Scan convert an ellipse with center as origin and major and minor radius as 6 and 4 in the first quadrant using Bresenham's algorithm. 5(CO1 , CO2)

2. (a) Write OPENGL display function to draw the circle using OpenGI primitive. Also write the init () function to set the background color, picture color, picture boundary and Orthographic projection. 4(CO1)

(b) Briefly explain the usage of the functions with their syntax :

(i) glRotate ()

(ii) glClear()

(iii) glFrustum()

(iv) glViewport(). 4(CO1)

(c) Relate the OpenGI with other API available. 2(CO1)

3. (a) Scan convert the polygon defined by the vertices (2 , 2) , (4 , 4) , (6 , 2) , (8 , 4) , (4 , 8) and (0 , 4) using following algorithms :

(i) Edge Fill

(ii) Simple Seed Fill (Assume seed pixel is 5 , 4) 8(CO2)

(b) Explain how half toning is used to display the image ? 2(CO1)

4. (a) Use the Cohen Sutherland algorithm to clip line P1(70 , 20) and P2(120 , 80) against a window whose lower left corner is at (50 , 50) and upper right corner at (100 , 100). 5(CO3)

(b) Apply the Cyrus Beck Algorithm to clip a line from p1(1 , 1) to p2(9 , 9) against the clipping window defined by the coordinates A (5 , 1) , B (9 , 1) , C (9 , 7) , D (5 , 7) , E (2 , 4). 5(CO3)

5. (a) A mirror is placed vertically such that it passes through (10 , 0) and (0 , 10). Determine the reflected view of triangle ABC with coordinates A (5 , 50) , B (20 , 40) and C (10 , 70). 5(CO3)

(b) Illustrate how to perform the rotation about an arbitrary axis in 3 D with diagram. 5(CO3)

OR

(c) Discriminate parallel and perspective projection. Derive the transformation matrix for perspective projection. 5(CO3)

6. Attempt any **Two** :—

(a) Compare the RGB, CMY and HIS color model with their applications. How to convert RGB model to CMY model. 5(CO4)

(b) Explain Z buffer algorithm for visible surface detection with the help of an example. 5(CO4)

(c) Enlist and explain shading algorithms with their disadvantages. 5(CO4)