H

Roll No. .....

# TMC–401

## M. C. A. (FOURTH SEMESTER)

## MID SEMESTER

## EXAMINATION, April/May, 2022

GRAPHICS AND VISUAL COMPUTING

**Time : 1½ Hours**

**Maximum Marks : 50**

**Note :** (i) Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each question carries 10 marks.

1. (a) Calculate the pixel positions along a straight line between A (10, 12) and B (20, 20) using DDA algorithm.

10 Marks (CO1)

***P. T. O.***

OR

(b) Derive midpoint circle algorithm and apply that algorithm to find the pixel values of the circle whose radius $r = 4$ and center of circle (0, 0). 10 Marks (CO1)

2. (a) Describe how to clip the given lines using Cohen-Sutherland line clipping algorithm. Explain the above with suitable examples and equations. 10 Marks (CO2)

OR

(b) Describe the flood fill algorithm for a polygon with suitable example. 10 Marks (CO2)

3. (a) Show that two successive reflection about either of the coordinate axis is equivalent to single rotation about the coordinate origin. 10 Marks (CO2)

OR

(b) Write short notes on parallel projection and perspective projection with suitable diagram. 10 Marks (CO2)



4. (a) Derive the write the generalized Bresenham's line drawing algorithm. 10 Marks (CO1)

OR

(b) Explain Sutherland-Hodgeman polygon clipping algorithm in detail. 10 Marks (CO1)

5. (a) Show that the composition of two rotation is additive by concatenating the matrix representation for $R(\alpha)$. $R(\beta) = R(\alpha + \beta)$. 10 Marks (CO2)

OR

(b) Derive a general form for 3-D rotation about the following : 10 Marks (CO2)

(i) $x$-axis

(ii) $y$-axis

(iii) $z$-axis