National Institute of Technology, Silchar

(UG) Mid Semester Examination, March 2022

Subject Code: CS 308 Subject: Graphics and Multimedia

Semester: 6th Department: Computer Science and Engineering

Duration: 1 hour 15 minutes Total Marks: 30

Use the conventions followed in the text book *Computer Graphics by Hearn and Baker*

(The questions are self-explanatory and need no explanation)

Answer all the questions.

Q No.		Question	Marks	CO
1	**a.**	Write the working principle of color CRT monitors using shadow mask method.	5	CO1
	b.	A line is to be drawn from (1, 2) to (12, 18) on a raster screen. Apply Brasenham line drawing algorithm. Show the calculated coordinates in tabular format as given below and also draw the line using suitable sampling points.	5	CO2

k	P_k	(x_{k+1}, y_{k+1})

2	**a.**	Modify midpoint circle algorithm so that the start position is (***r, 0***) and points are to be generated along the curve path in **anticlockwise** direction.	5	CO2
	b.	Plot a complete circle centred at (2, 5) having radius of 7 units using the ***modified midpoint circle algorithm which you have derived in Q. No. 2(a)***. Show the calculated coordinates in tabular format as given below and also draw the circle.	5	CO2

k	P_k	(x_{k+1}, y_{k+1})	*Actual points*

3	A unit square is transformed by a 2 × 2 transformation matrix. The resulting position vectors are $\begin{bmatrix}0 & 3 & 3 & 6\\ 0 & 3 & 2 & 5\end{bmatrix}$. Find the transformation matrix. Show all the calculations.	5	CO2
4	Use composite transformation to fix the triangle $\begin{bmatrix}1 & 0 & -1\\ 0 & 1 & 0\end{bmatrix}^T$ inside the square $\begin{bmatrix}1 & 1 & 0 & 0\\ 0 & 1 & 1 & 0\end{bmatrix}^T$ so that the base coincides with the bottom edge of the square and the top vertex touches the middle of the top edge of the square.	5	CO2

Course Outcomes (CO):

1. Learn the basic principles and commonly used paradigms and techniques of computer graphics and develop a facility with the relevant mathematics of computer graphics. Also, Students will create interactive graphics applications using one or more graphics application programming interfaces.
2. Students will have an understanding of 2D and 3D graphics and algorithms including scan conversions, polygon filling, clipping, transformations, 3D viewing, Shading and Illumination model, lighting and Texture mapping.
3. Students will learn the techniques behind various audio-video compression and decompression, the file formats and animation.
4. Be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.