

11. Explain the concept of point clipping in Computer Graphics. Discuss the algorithm used for point clipping and provide an example demonstrating how point clipping is implemented ?
12. Explain the Digital Differential Analyzer (DDA) line drawing algorithm used in Computer Graphics. Discuss the step-by-step line generation process using DDA and provide a numerical example demonstrating the algorithm's application.
13. Consider a 3D object represented by the vertices : P1(1, 1, 1), P2(2, 3, 1), P3(4, 2, 3) and P4(3, 1, 4). Perform the following 3D transformations on the object and determine the new coordinates of the vertices after each transformation :
- (a) Translate the object by $T(2, -1, 3)$
 - (b) Scale the object uniformly by a factor of 2 with respect to the origin.
 - (c) Rotate the object by 45° about the x -axis.
- Show the step-by-step calculations for each transformation.

MCA-301

June – Examination 2024

MCA (IIIrd Year) Examination

COMPUTER GRAPHICS

Paper : MCA-301

Time : 3 Hours]

[Maximum Marks : 80

Note :- The question paper is divided into three Sections A, B and C. Write answers as per the given instructions.

Section-A

8×2=16

(Very Short Answer Type Questions)

Note :- Answer all questions. As per the nature of the question delimit your answer in one word, one sentence or maximum up to **30** words. Each question carries 2 marks.

1. (i) What are the primary applications of Computer Graphics ?

- (ii) What do you mean by Raster Graphics ?
- (iii) List any *two* image compression techniques.
- (iv) Explain Screen and world coordinates with examples.
- (v) What is the need for a graphics device driver ?
- (vi) What is the use of the Illumination Model ?
- (vii) What is a Curve Interpolation ? Give an example.
- (viii) Name any *two* animation softwares used for creating computer animations.

Section-B **4×8=32**

(Short Answer Type Questions)

Note :- Answer any *four* questions. Each answer should not exceed **200** words. Each question carries 8 marks.

- 2. Using the Mid-point Circle Generation Algorithm, draw a circle with radius $r = 5$ units centered at point C(3, 2). Show the step-by-step calculations for plotting the pixels on the circle.
- 3. Explain the concept of Anti-aliasing in Computer Graphics.

- 4. Describe the RGB and CMYK color models used in Computer Graphics. Discuss their primary differences, advantages and typical digital imaging and printing applications.
- 5. Explain in detail the different Illumination Methods and Rendering Methods.
- 6. Describe the boundary fill algorithm to fill a 4-connected region with a suitable example.
- 7. What is Edge Detection ? Explain any one edge detection technique in digital image processing.
- 8. Explain the term persistence and resolution in the reference to CRT.
- 9. Write short note on A-Buffer Method's Algorithm.

Section-C **2×16=32**

(Long Answer Type Questions)

Note :- Answer any *two* questions. You have to delimit your each answer maximum up to **500** words. Each question carries 16 marks.

- 10. Compare and contrast the Phong and Gouraud shading models in Computer Graphics.