

**MASTER OF COMPUTER
APPLICATION
(MCA) (REVISED)
Term-End Examination
June, 2026**

**MCS-053 : COMPUTER GRAPHICS AND
MULTIMEDIA**

Time : 3 Hours

Maximum Marks : 100

Note : (i) *Question No. 1 is compulsory.*

(ii) *Attempt any **three** questions from the rest.*

1. (a) What is frame buffer ? In a 600×400 pixel, how many bytes does a frame buffer need ? Explain your answer. 5
- (b) What is staircase effect ? Do you agree with the statement, "Staircase effect facilitates smooth line generation" ? Justify your answer with suitable arguments. 5

- (c) Prove the following for Bezier curve : 5
 $P(u = 0) = P_0$
 - (d) Explain the differences between Euclidean Homogeneous coordinate system in 2D transformation. 5
 - (e) Explain the process of simulating motion using zero acceleration with the help of a diagram. 5
 - (f) Determine the perspective projection of point $P(x, y, z)$ on $z = 0$ plane, where the centre of projection is at $E(0, 0, -10)$. 5
 - (g) Differentiate between window and viewport region ? Explain how window to viewport mapping is performed. 5
 - (h) Find the transformation matrix for the reflection about the line $y = -x$. 5
2. (a) Write Bresenham's circle generation algorithm. Compute coordinates of points of circle drawn with center at $(0, 0)$ and radius 8 using Bresenham's circle generation algorithm. 10

- (b) How are frame buffers used to control colour and intensity of any image ? You are required to support your answer with suitable diagram and bit plane tables. 5
- (c) Differentiate between Parallel projection and Perspective projection. 5
3. (a) Verify that two successive rotations are additive in nature *i.e.*,
 $R_{\theta_1} \cdot R_{\theta_2} = R_{\theta_1 + \theta_2}$. 5
- (b) Explain DDA line drawing algorithm. What are the disadvantages of this algorithm ? Draw a line from (6, 3) to (12, 6) using DDA line drawing algorithm. 10
- (c) Explain the basic Ray Tracing Algorithm with the help of a diagram. 5
4. (a) Differentiate between the following : 10
- (i) Geometric continuity and Parametric continuity.
- (ii) Gourand shading and Phong shading.

- (b) Explain the Z buffer visible surface detection method. 5
- (c) Explain the scan line method for visible surface detection. 5
- 5. (a) How many key frames does a one-minute animation film sequence with no duplications require ? 5
- (b) What is Lossy Compression technique ? How is it different from lossless compression technique ? 5
- (c) Write short notes on the following : 10
 - (i) Area subdivision method
 - (ii) Sutherland-Hodgman Polygon Clipping Algorithm.

× × × × ×