

**MASTER OF COMPUTER
APPLICATIONS (MCA) (REVISED)**

Term-End Examination

December, 2025

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

Time : 3 Hours

Maximum Marks : 100

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

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

1. (a) Write 2D matrix representation in homogeneous coordinate system for the following transformations : $1 \times 5 = 5$

(i) Translation

(ii) Rotation

(iii) Scaling

(iv) Reflection

(v) Shear

- (b) What is Windowing transformation ?
Explain window to viewport mapping
with equation and diagram. 5
- (c) Compare Bitmap Graphics with Vector
Graphics. Give the characteristics of
both. 5
- (d) Differentiate between the following :
5×3=15
- (i) Parametric Continuity *vs.*
Geometric Continuity
- (ii) Gouraud Shading *vs.* Phong
Shading
- (iii) Frame Vs. Sprite Animation
- (e) Write Z-Buffer algorithm. What is the
maximum number of objects that can be
handled by the Z-buffer algorithm ? 5
- (f) Briefly discuss the term 'Authoring
tools' and list the types of authoring
tools. 5
2. (a) Consider a 2-D square A(1, 0), B(0, 0),
C(0, 1) and D(1, 1). Rotate the square
ABCD by 45 degrees in clockwise about
the point A(1, 0). 6

- (b) Determine the projection of point $P(x, y, z)$ on $Z = 0$ plane, provided centre of projection it at point $Q(0, 0, -d)$. Support your solution to the given problem with a suitable diagram. 8
- (c) Compare and contrast Cohen-Sutherland and Cyrus-Beck line clipping algorithm. 6
3. (a) Write down the DDA line generation algorithm. Use DDA line generation algorithm to draw line segment from points $(1, 1)$ to $(9, 7)$. 8
- (b) Compare Computer Graphics and Animation. Derive the mathematical expression to simulate zero-acceleration in any animation. Use the expression to find the time at which the j th in-between frame to be placed for simulating zero-acceleration in the animation. 7

- (c) Differentiate between Ray tracing and Ray casting. 5
4. (a) What is a Bezier curve ? Calculate *two* points on Bezier curve whose control points are $P_0(1, 1)$, $P_1(2, 5)$, $P_2(5, 5)$ and $P_3(8, 0)$, 8
- (b) Distinguish between area subdivision and scan-line methods. Discuss the visibility test made in these methods. 7
- (c) Find the equation of the plane which passes through the point $P(0, 0, 0)$ and the normal to the plane is given by $\vec{N}(1, 0, -1)$. 5
5. Write short notes on the following : $4 \times 5 = 20$
- (a) Bresenham Line Generation Algorithm
- (b) Axonometric Projections and its types
- (c) De Casteljeau algorithm
- (d) Lossless and Lossy Audio formats

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