MASTER OF COMPUTER

APPLICATIONS (MCA) (REVISED)

Term-End Examination

December, 2023

MCS-053 : COMPUTER GRAPHICS AND

MULTIMEDIA

Time : 3 Hours   *Maximum Marks : 100*

Note : *Question No.* **1** *is compulsory. Attempt any*

three questions from the rest.

1. (a) What is computer animation and how is it different from computer graphics ?   5

   (b) Discuss all the cases of scan line polygon fill algorithm, with suitable diagram.   5

   (c) Verify the statement that "two successive rotations are additive in nature".   5

(d) Determine the general expression for a cubic Bezier curve, with vertices (control point) $P_0(0, 40)$; $P_1(40, 40)$; $P_2(60, 20)$; $P_3(60, -10)$, and use it to find two points on the curve.   5

(e) Briefly describe about the following file formats :   5

   (i) JPEG

   (ii) TIFF

(f) Explain Isometric projection. Differentiate among Isometric, Diametric and Trimetric projections.   5

(g) How does Z-buffer algorithm determine which surfaces are hidden ? What is the maximum number of objects that can be handled by Z-buffer algorithm ?   5

(h) Differentiate between the following :   5

    (i) Frame Animation and Sprite Animation

    (ii) Cohen-Sutherland algorithm and Sutherland-Hodgman algorithm

2. (a) Write the midpoint circle generation algorithm and use the same to produce a circular arc of radius 8 units in the first quadrant from $x = 0$ to $x = y$.   10

   (b) Write the Pseudo Code of DDA line generation algorithm, and use it to produce a line segment between points (1, 1) and (9, 7). Also compare DDA line generation algorithm and Bresenham line generation algorithm.   10

3. (a) Determine the final coordinates of the perspective projection of an object, when the object is first rotated w.r.t. y-axis by 30° in clockwise direction and then w.r.t. x-axis by 45° in clockwise direction and finally it is projected on to $z = 0$ plane with the certre of projection at $(0, 0, -5)$.   10

   (b) Discuss the Cyrus-Beck line clipping algorithm. Compare it with the Cohen-Sutherland line clipping algorithm.   5

   (c) What are the conditions to be satisfied in the area subdivision method so that a surface not to be divided further ?   5

4. (a) Prove $\sum\limits_{L=0}^{n} B_{n,i}(4) = 1$, where $B_{n,i}(4)$ is the Bernstein Polynomial.   5

(b) What are the authoring tools ? Write the various types of authoring tools available. Discuss any *one* of them. 5

(c) Differentiate Gouraud shading and Phong shading. 5

(d) Find the equation of the frame which passes through to point P(0, 0, 0) and say the normal to the plane is given by $\vec{N}(1, 0, -1)$. 5

5. (a) How many key frames are required for a 30-second animation film sequence with no duplication ? What will be the answer if duplication is there ? 5

(b) Briefly discuss any *two* of the following audio file formats : 5

(i) Formats with lossless compression

(ii) Formats with lossy compression

(iii) Uncompress formats

(c) Explain the following : 10

    (i) Intensity control using frame-buffer

    (ii) Simulating acceleration

    (iii) Anti-aliasing

    (iv) Orthographic projections

    (v) Ray tracing