

BCA/CMG:503(O)

2025

(5th Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper : CMG:503 (Old Course)

(Computer Graphics)

Full Marks : 70

Pass Marks : 45%

Time : 3 hours

(PART : B—DESCRIPTIVE)

(Marks : 45)

*The figures in the margin indicate full marks
for the questions*

1. (a) Write a short note on plasma display panel. 4
- (b) Define computer graphics. Discuss the difference between raster scan and random scan display systems. 1+4=5
- Or
- (c) Describe the working of a mouse as a graphic input device. 4
- (d) Describe the principle and construction of a liquid crystal display (LCD). 5

2. (a) Write a step-by-step algorithm for Liang-Barsky line clipping and discuss its efficiency. 5
- (b) Describe the use of Active Edge List in scan line polygon filling. 4
- Or
- (c) Explain how inside-outside tests are used in polygon clipping. 4
- (d) Given a point (1, 1) and (3, 3). Draw a line using DDA algorithm. 5
3. (a) Given a square with coordinate point A (0, 3), B (3, 3), C (3, 0), D (0, 0). Apply translation with distance 1 towards x -axis and 1 towards y -axis. Obtain the new coordinate of the square. 5
- (b) Differentiate between rubber-band methods and simple line drawing techniques. 4
- Or
- (c) Magnify a triangle placed at A (0, 0), B (1, 1), C (5, 2) to twice its size. 5
- (d) Explain the concept of zooming. How is it implemented using scaling transformation? 4
4. (a) Explain the data structure of a polygon table and its component. 3
- (b) Describe how cubic splines ensure smoothness and continuity. 3

- (c) Differentiate between uniform and non-uniform B-spline curves. 3
- Or*
- (d) Explain the challenges in rendering curved surfaces. 3
- (e) What is a convex polygon? How is it different from a concave polygon? 3
- (f) Explain the significance of the plane equation in graphics modelling. 3
5. (a) Differentiate between hidden lines elimination and hidden surface removal. Give example where each is used. 4
- (b) Given a 3D object with coordinate points A (0, 3, 3), B (3, 3, 6), C (3, 0, 1), D (0, 0, 0). Apply scaling parameter 2 towards X-axis, 3 towards Y-axis and 3 towards Z-axis, and obtain the new coordinates of the object. 5
- Or*
- (c) Describe the Z-buffer algorithm in detail with its working principle. 4
- (d) Given a 3D object with coordinate points A (0, 3, 1), B (3, 3, 2), C (3, 0, 0), D (0, 0, 0). Apply translation with the distance 1 towards X-axis, 1 towards Y-axis and 2 towards Z-axis, and obtain the new coordinate of the object. 5

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(5th Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper : CMG:503 (Old Course)

(Computer Graphics)

(PART : A—OBJECTIVE)

(Marks : 25)

The figures in the margin indicate full marks for the questions

1. Put a Tick (✓) mark against the correct answer in the brackets provided : 1×10=10

(a) Which of the following is a computer graphics type?

(i) Raster and vector ()

(ii) Raster and scalar ()

(iii) Scalar only ()

(iv) All of the above ()

(b) In a graphical system an array of pixels in the picture is stored in which of the following locations?

(i) Frame buffer ()

(ii) Processor ()

(iii) Memory ()

(iv) All of the above ()

(c) Which of the following is the purpose for using clipping in computer graphics?

(i) Copying ()

(ii) Zooming ()

(iii) Adding graphics ()

(iv) Removing objects and lines ()

(d) The Cohen-Sutherland algorithm divides the region into _____ number of spaces.

(i) 8 ()

(ii) 6 ()

(iii) 7 ()

(iv) 9 ()

- (e) A translation is applied to an object by
- (i) repositioning it along a straight line path ()
 - (ii) repositioning it along with circular path ()
 - (iii) Both (i) and (ii) ()
 - (iv) None of the above ()

(f) If the scaling factor values S_x and $S_y < 1$, then

- (i) it reduces the size of object ()
- (ii) it increases the size of object ()
- (iii) it stunts the shape of an object ()
- (iv) None of the above ()

(g) In a polygon mesh, what is the typical relationship between adjacent polygons?

- (i) Each edge is shared by at most two polygons ()
- (ii) Polygons can overlap freely ()
- (iii) Each polygon has a unique edge ()
- (iv) No edges are shared between polygons ()

(h) The shape of Bezier curve is controlled by its

(i) knots ()

(ii) endpoints ()

(iii) Control points ()

(iv) All of the above ()

(i) Which of the following operations can be used to zoom in or out around any axis on a 3D object from its original position?

(i) Rotation ()

(ii) Shearing ()

(iii) Scaling ()

(iv) Translation ()

(j) In the back-face detection algorithm, if V is along the positive Z direction, then polygon is back-face if

(i) $C \geq 0$ ()

(ii) $C \leq 0$ ()

(iii) $C \geq 1$ ()

(iv) $C \leq 1$ ()

2. State whether the following are *True (T)* or *False (F)*
by putting a Tick (✓) mark : 1×5=5

(a) The position that you are viewing a scene is called the eye point.

(T / F)

(b) A transformation is a function that takes geometry and produces new geometry.

(T / F)

(c) Anti-aliasing is used to make images sharper and removed jagged edges.

(T / F)

(d) In raster scan display, the electron beam directly draws on the screen.

(T / F)

(e) Blobby object cannot blend or merge with nearby object.

(T / F)

3. Answer the following questions in short : $2 \times 5 = 10$

(a) How is computer graphics used in virtual reality (VR)?

(b) Differentiate between flood fill and boundary fill.

(c) Why are homogeneous coordinates used in transformation?

(d) What are vertices and edges in a polygon mesh?

(e) State any two real-life examples of 3D transformation in animation or CAD.
