

Professional Course (Odd) Examination, 2025

(5th Semester)

BACHELOR OF COMPUTER APPLICATIONS**(Computer Graphics)***Full Marks : 75**Time : 3 hours**The figures in the margin indicate full marks for the questions***(PART : A—OBJECTIVE)***(Marks : 25)*

SECTION—I

*(Marks : 15)*I. Tick (✓) the correct answer in the brackets provided : 1×10=10

1. Who is widely regarded as the father of Computer Graphics?

- (a) Bresenham ()
- (b) Ivan Sutherland ()
- (c) John von Neumann ()
- (d) Charles Babbage ()

2. Which of the following is not a type of computer graphics?

- (a) Raster graphics ()
- (b) Vector graphics ()
- (c) Analog graphics ()
- (d) 3D graphics ()

3. In polygon filling, which algorithm is most efficient for scan conversion?
- (a) Flood-fill algorithm ()
 - (b) Boundary-fill algorithm ()
 - (c) Scan-line polygon-fill algorithm ()
 - (d) Midpoint ellipse algorithm ()
4. In circle drawing algorithms, the property of 8-way symmetry helps in
- (a) reducing memory size ()
 - (b) reducing computation time ()
 - (c) increasing resolution ()
 - (d) smoothing jagged edges ()
5. The Sutherland-Hodgman algorithm is primarily used for
- (a) point clipping ()
 - (b) line clipping ()
 - (c) polygon clipping ()
 - (d) curve clipping ()
6. Which of the following planes is used for 2D transformations?
- (a) 1D plane ()
 - (b) 2D plane ()
 - (c) 3D plane ()
 - (d) 4D plane ()
7. Choose the odd one.
- (a) Rotation ()
 - (b) Reflection ()
 - (c) Shearing ()
 - (d) Sliding ()

8. The transformation that shifts an object from one position to another without changing its shape, size or orientation is called
- (a) translation ()
 - (b) rotation ()
 - (c) scaling ()
 - (d) shearing ()
9. Why is data compression necessary in multimedia systems?
- (a) To increase the size of the media ()
 - (b) To reduce storage and transmission requirements ()
 - (c) To improve database indexing ()
 - (d) To improve the power consumption of the CPU ()
10. The definition of a multimedia system is
- (a) a system that processes only numbers ()
 - (b) a system that integrates two or more media with computer control ()
 - (c) a computer that runs only one application ()
 - (d) a device that prints images ()

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

1. A plotter is an example of both a hard-copy and soft-copy device. (T / F)
2. A line is the simplest output primitive in computer graphics. (T / F)
3. The 2D viewing pipeline describes the steps needed to display objects on the screen. (T / F)
4. Viewing coordinates are also known as camera coordinates. (T / F)
5. The TIFF file format is commonly used for high-quality images and scanning. (T / F)

SECTION—II

(Marks : 10)

III. Answer the following questions in short :

2×5=10

1. Why is refresh rate important in CRT displays?
2. State one advantage of Bresenham's line algorithm over DDA.
3. State two advantages of Liang-Barsky line clipping algorithm.
4. What is 3D modeling?
5. What is the main advantage of MIDI over digital audio?

(PART : B—DESCRIPTIVE)

(Marks : 50)

IV. Answer the following questions :

10×5=50

1. (a) What is computer graphics? List the different applications of computer graphics. 2+3=5
(b) Write a note on a video display device. 5

OR

2. (a) Differentiate between impact and non-impact printers. 5
(b) Differentiate between soft-copy and hard-copy devices in a graphic system. 5
3. (a) Explain the midpoint ellipse algorithm in detail. 5
(b) Differentiate between boundary-fill algorithm and flood-fill algorithm. 5

OR

4. Using the DDA algorithm, plot the line from (2,3) to (10,8). Show the calculation of dx , dy , steps and each intermediate pixel position. 10

5. (a) Write notes on of the following : 2½×2=5
(i) Window
(ii) Viewport
- (b) What is clipping in computer graphics? What are the different types of clipping? 1+4=5

OR

6. Given the four vertices of a 2D shape at coordinates (3, 3), (5, 3), (3, 5), and (5, 5). Apply a scaling transformation with scaling factors $s_x = 5$ and $s_y = 6$. Compute the new coordinates of each vertex after scaling. 10
7. (a) Write a note on the 3D viewing pipeline with a diagram. 5
(b) Explain the purpose of homogeneous coordinates in 3D transformations in detail. 5

OR

8. (a) Write a note on the rotation transformation of 3D. 5
(b) Differentiate between parallel projection and perspective projection. 5
9. (a) What are multimedia data interface standards? Why are they important? 5
(b) Write notes on (i) rich-text format, (ii) mpeg file format. 2½×2=5

OR

10. What is multimedia? Discuss how the integration of multimedia elements enhances the effectiveness and popularity of computer graphics. 10
