

H/28/11/2023

BCA/5/CC/26

Student's Copy

**Professional Course Examination (Odd), 2023**

( 5th Semester )

**BACHELOR OF COMPUTER APPLICATIONS**

Course No. : BCA/5/CC/26

**( 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. A type of printer that works by direct contact with an ink ribbon with paper is

- (a) inkjet printer ( )
- (b) impact printer ( )
- (c) non-impact printer ( )
- (d) plotter ( )

2. The smallest addressable element of a picture represented on a screen is

- (a) pixel ( )
- (b) vector ( )
- (c) bitmap ( )
- (d) raster ( )

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3. Which of the following is the most basic graphical element in computer graphics?
 

(a) Line	( )	(b) Dot	( )
(c) Point	( )	(d) All of the above	( )
  
  4. In the boundary fill algorithm of four connected approaches, which of the following pixels are tested?
 

(a) Left, right	( )
(b) Four diagonals	( )
(c) Left, right, above, below and four diagonals	( )
(d) Left, right, above, below	( )
  
  5. Which of the following planes is used for 2D transformations?
 

(a) 1D plane	( )	(b) 2D plane	( )
(c) 3D plane	( )	(d) 4D plane	( )
  
  6. The algorithm which can clip concave polygons without leaving any residue behind is
 

(a) Sutherland-Hodgman polygon clipping algorithm	( )
(b) Weiler-Atherton polygon clipping	( )
(c) Liang-Barsky clipping algorithm	( )
(d) Nicholl-Lee-Nicholl clipping algorithm	( )
  
  7. How many types of projections are present in 3D graphics?
 

(a) 1	( )	(b) 2	( )
(c) 6	( )	(d) 8	( )
  
  8. Choose the odd one.
 

(a) Reflection	( )	(b) Moving	( )
(c) Rotation	( )	(d) Shearing	( )



9. Which of the following best describes the process of streaming?

- (a) The simultaneous downloading and playback of multimedia content over the Internet. ( )
- (b) The process of compressing multimedia files for efficient storage. ( )
- (c) The conversion of multimedia files from one format to another. ( )
- (d) The integration of multiple media elements into a single presentation. ( )

10. A smaller version of an image is called a

- (a) bitmap ( )
- (b) clipart ( )
- (c) thumbnail ( )
- (d) portable network graphic ( )

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. Picture definition stored in a memory area is called a frame buffer.

( T / F )

2. Bresenham's algorithm is an incremental scan conversion algorithm and generates duplicate points sometimes.

( T / F )

3. The transformation that is used to alter the size of an object is called translation.

( T / F )



4. Orthographic projection and perspective projection are the two types of 3D parallel projection.

(T / F)

5. MIDI message includes a status byte and up to two data bytes.

(T / F)

## SECTION—II

( Marks : 10 )

III. Answer the following questions :

2×5=10

1. (a) Explain the two types of computer graphics.

OR

- (b) Write a short note on the emissive display system.

2. (a) What do you mean by primitives output?

OR

- (b) What is a polygon? Give one example of a polygon with a diagram.

3. (a) What are the uses of the homogeneous coordinate system?

OR

- (b) What are viewport and window in computer graphics?

4. (a) What is 3D modeling?

OR

- (b) Write a short note on 3D projection.

5. (a) What is data compression and why do we need it?

OR

- (b) Explain JPEG and MPEG.



**( PART : B—DESCRIPTIVE )**

**( Marks : 50 )**

**IV. Answer the following questions :**

**10×5=50**

1. (a) What is computer graphics? What are the five applications of computer graphics? **1+4=5**
- (b) Differentiate between beam penetration and shadow mask method in a color monitor. **5**

**OR**

- (c) Distinguish between random scan and raster scan monitors. **5**
- (d) Explain flat panel displays. **5**
2. (a) Calculate and draw a line using the coordinates point from (5, 7) to (10, 15) using the DDA algorithm. **6**
- (b) Explain the scan line polygon fill algorithm. **4**

**OR**

- (c) Using the midpoint circle drawing algorithm, generate all the points to form a circle where the centre coordinate points (0, 0) and radius is 8. **10**
3. (a) Perform window-to-viewport transformation based on the following values :

$$\begin{array}{ll} x_w \text{min} = 10 & x_v \text{min} = 20 \\ x_w \text{max} = 70 & x_v \text{max} = 50 \\ y_w \text{min} = 20 & y_v \text{min} = 30 \\ y_w \text{max} = 50 & y_v \text{max} = 70 \end{array}$$

where  $x_w = 30$ ,  $y_w = 80$ , then find the value of  $(x_v, y_v)$  in the viewport. **10**

**OR**

- (b) What is clipping in computer graphics? What are the different types of clipping? **1+3=4**
- (c) Based on the coordinate points (0, 0), (2, 0), (0, 2), (2, 2), where  $t_x = 2$ ,  $t_y = 3$ , find a new coordinate point using the translation transformation of 2D. **6**



4. (a) Differentiate between parallel projection and perspective projection. 5

(b) Write a note on the 3D viewing pipeline with a diagram. 5

OR

(c) What is the difference between a 2D shape and a 3D shape with an example? 5

(d) Write a note on the shear transformation of 3D. 5

5. (a) What is multimedia? What are the different elements of multimedia? 1+4=5

(b) What is an animation? What are the different types of animation? 1+4=5

OR

(c) What are the different video and image formats used in multimedia? 5

(d) Write a note on digital audio. 5

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OR

(b) What is clipping in computer graphics? What are the different types of clipping? 5

(c) Based on the coordinate points (0, 0), (2, 0), (0, 2), (2, 2), where  $t_x = 2$ ,  $t_y = 3$ , find a new coordinate point using the translation transformation of 2D. 5