



**UNIVERSITY EXAMINATIONS: 2025/2026**  
**EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN**  
**INFORMATION TECHNOLOGY**  
**BSIT /BBIT 400**  
**COMPUTER GRAPHICS AND ANIMATION**  
**END TERM EXAMINATION**

**DATE: DECEMBER, 2025**

**TIME: 3 HOURS**

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**INSTRUCTIONS: Question One is Compulsory, Choose Three Other Questions**

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**SECTION A (COMPULSORY)**

**QUESTION ONE (10 Marks) Compulsory**

- a) Discuss the purpose of Parallel projection methods used in creating 3-D sceneries (2 marks)
- b) Explain two advantages of using Graphical User Interfaces. (2 Marks)
- c) Explain any two animation concepts. (2 Marks)
- d) Explain glClear(GL\_COLOR\_BUFFER\_BIT) in relation to computer graphics.(2 marks)
- e) Distinguish between Emissive and non-emissive displays. (2 Marks)

## SECTION B

### (ANSWER ANY THREE (3) QUESTIONS IN THIS SECTION)

#### Question Two (10 Marks)

a) Given a polygon with the vertices (0,0), (0,1), (1,0) and (1,1). Draw the shape obtained after transforming this unit square with the homogeneous matrix M given below. (5 Marks)

$$\mathbf{M} = \begin{pmatrix} 1 & 0 & 2 \\ 0 & 1 & -1 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 3 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} \cos(90^\circ) & -\sin(90^\circ) & 0 \\ \sin(90^\circ) & \cos(90^\circ) & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

b) Rasterize a line having end points (10,20) and (16,25) and plot the resultant pixels using

Bresenham's algorithm.

(5 Marks)

#### QUESTION THREE (10 Marks)

a) Consider two raster systems with the resolutions of 1280 x 720 and 2048 x 1536.

i. Describe two ways of refreshing a display screen. (2 marks)

ii. How many pixels could be accessed per second in each of these systems by a display controller with a refresh rate of 120Hz? (2 marks)

b) Film animators use a variety of methods for depicting and emphasizing motion sequences. Discuss three traditional animation techniques giving examples.

(6 Marks)

#### QUESTION FOUR (10 Marks)

a) Explain any two principles of animation. (4 Marks)

b) Suppose you are given a scene to render through the graphics pipeline. Analyze Cartesian reference frames and procedure you would use to construct and display the scene. (6 marks)

**QUESTION FIVE (10 marks)**

- a) John wants to acquire a graphics display device, explain five factors he needs to consider in the acquisition process. (5 Marks)
- b) Write a simple OpenGL program for rendering on a black background and red square. (5 marks)

**QUESTION SIX (10 marks)**

- a) Distinguish between the following terms
  - i. Simulation and animation (2 marks)
  - ii. Window port and view port (2 marks)
- b) Given 3D geometric primitives explain how you would generate an image using the 3D rendering pipeline. ( 6 Marks)

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