PAN AFRICA CHRISTIAN UNIVERSITY

Where Leaders are Made

UNIVERSITY EXAMINATIONS: 2025/2026

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

BBIT400

COMPUTER GRAPHICS AND ANIMATION

DATE:APRIL 2026 **TIME: 2 HOURS**

INSTRUCTIONS: Question One is Compulsory, Choose Three Other Questions

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SECTION A (COMPULSORY)

Question 1 (15 marks)

a. Discuss three types of computer animation (2Marks)

b. Explain a suitable method to have the fighter jet fly along the line (3 Marks)

c. Discuss kinematics and how it is applied in computer animation (3 Marks)

d. Computer graphics have many commands used for different function, name the command used to combine two regions together into one. (2 marks)

e. A software development company contracted you to design a logo for them, state any two types of software you will use to design and justify the reason you chose that software. (2 marks)

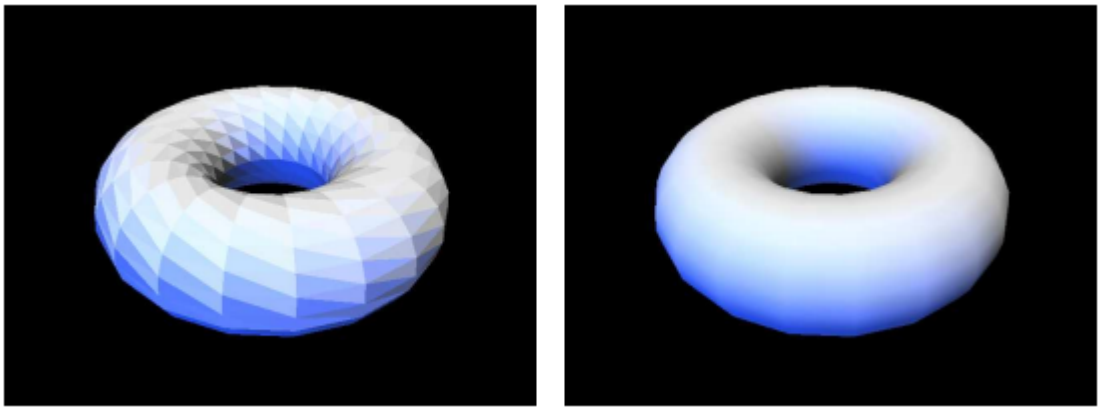
f. You have been mandated by your organization to come up with dynamic images for presentation to a prospective client on the new product of the company, highlight 3 steps you will apply digital technologies to create designed solutions . (3 marks)

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

Question 2 (15 marks)

a. Discuss Set Driven Key animation in Autodesk Maya and its advantages over Key frame animation6 Marks)

b. Study the diagram below and answer given questions.



i) Discuss the transformation applied to have final image on the right. (4 marks)

ii) Explain, Justifying your answer if clipping was applied or not. (2 marks)

c. Discuss morphing and how it is applied to computer animation (3Marks)

Question 3 (15 marks)

a. Explain how animators create the "illusion of movement" (4 Marks)

b. Explain with the algorithm procedure of drawing a circle using mid-point circle algorithm.

(5 marks)

c. Given a triangle with vertices A(2,3), B(5,5), C(4,3) by rotating 90 degree about the origin and then translating two unit in each direction. Use homogenous transformation matrix to find the new vertices of the triangle. (6 marks)

Question 4 (15 marks)

a) Frame buffer display contains a frame buffer, which is a storage device and stores the image in terms of 0's and 1's. Discuss. (5 marks)

b) Derive the formula for windows to viewport transformation. Given a window bordered by (0,0) at the lower left and (4,4) at the upper right. Similarly, a viewport bordered by (0,0) at the lower left and (2,2) at the upper right. If a window at position (2,4) is mapped into the viewport. Explain the position of viewport to maintain same relative placement as in window. (10 marks)

Question 5 (15 marks)

a. Discuss the biological phenomenon known as persistence of vision (4 Marks)

b. For a more convincing animation, you need to bounce the ball more sharply off the ground and speed up the ball's horizontal movement. Which Autodesk Maya toll will you use to make a more convincing animation and how will you use it? (6 Marks)

c. Consider a horizontal row of fragments that form part of a triangle during rasterization. Suppose the coordinates, normal and texture coordinates of the first and last fragment in the row have already been calculated. Calculate the coordinates of the other fragments as it scan along the row from the first fragment to the last fragment. (5 marks)

Question 6 (15 marks)

a) Given a triangle with vertices A(2,3), B(5,5), C(4,3) by rotating 90 degree about the origin and then translating two unit in each direction. Use homogenous transformation matrix to find the new vertices of the triangle. (5 marks)

b) Discuss the 3 main transformation in computer graphics and animation. (6 marks)

c) Computer graphics are commonly used in the current information technology era, explain any 2 areas where Computer graphics and animation are applied. (4 marks)