

CHUKA UNIVERSITY

**THIRD YEAR SEMESTER TWO EXAMINATION FOR THE AWARD OF
DEGREE OF BACHELOR OF COMPUTER SCIENCE AND BACHELOR OF
APPLIED COMPUTER SCIENCE**

**COSC 371 AND ACSC 374: COMPUTER GRAPHICS
STREAM (BSC. COMPUTER SCIENCE AND BSC. APPL.COMPUTER
SCIENCE)**

**Instructions: Attempt question 1 in section A and any other 2 questions in section B
SECTION A**

QUESTION ONE (20 MARKS)-COMPULSORY

- a) What is Computer Graphics? (2 marks)
- b) Reflect against the x axis, a polygon with the following end points (4, 6) (8, 16), (4, 10) and (8, 20) (5 marks)
- c) Define the following terms in reference to computer graphics: - (3 marks)
 - i. Morphing
 - ii. pixel
 - iii. Aspect ratio
- d) Give an account on how computer graphics has improved the Education & Training sector with appropriate example (3 marks)
- e) Rotate by 45 degrees anti-clockwise, a polygon with the following end points (10,10) (13,10), (13,13) and (10,13) (6 marks)
- f) Differentiate between Image Processing and Computer Graphics giving appropriate in each case. (4 marks)
- g) Using a neat well labeled diagram explain the basic design of magnetic deflection CRT (7 marks)

SECTION B: ATTEMPT ANY TWO QUESTIONS

QUESTION TWO (20 MARKS)

- a) Elaborate on the term “Flat Panel Display” (2 marks)
- b) Various devices are available for data input on graphics workstations. Name at least 6 devices. (3 marks)
- c) Explain the following 2D geometric Transformation: (9 marks)
- Translation
 - Rotation
 - Scaling
- d) Find the transformed point, P' , caused by rotating $P = (5, 1)$ about the origin through an angle of 90° . (6 marks)

QUESTION THREE (20 MARKS)

- a) Explain the following into details giving appropriate examples in each case: - (7marks)
- Raster Scans displays
 - Random Scan displays
- b) Explain the shear Transformation (3 marks)
- c) Explain the term **Horizontal Retrace** of the electron beam. (2 marks)
- d) Write a procedure for implementing **DDA algorithm** and hence write a program for drawing a line based on DDA line algorithm (Use a suitable language) (8 marks)

QUESTION FOUR (20 MARKS)

- a) Draw a line using the digital Differential analyzer line drawing algorithm starting at point (4,4) and ends at point (12,10) (6 Marks)
- b) Discuss at least 8 areas where Computer graphics is applied citing appropriate examples (4 marks)
- c) i. Define the term “**Clipping algorithm**” as used in computer graphics. (2marks)
- ii. With aid of appropriate diagrams, carefully explain **Sutherland-Hodgeman**

Polygon clipping algorithm

(10 marks)

QUESTION FIVE (20 MARKS)

- a) Draw a line using the Brenham's line drawing algorithm starting at point (1,4) and ends at point (11,10) (6 marks)
- b) Consider three different raster systems with resolutions of 540 x 380, 1080 x 924 and 1560 x 1048. What size is frame buffer (in bytes) for each of these systems to store 12 bits per pixel? (6 marks)
- c) With an aid of neat diagram, explain the basic design of a plasma panel display device (8 marks)