CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

FOURTH YEAR EXAMINATION FOR THE AWARD OF AWARD OF DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

COMP 420: COMPUTER GRAPHICS

STREAMS:BSC COMP SCI **TIME: 2 HOURS**

DAY/DATE:MONDAY 4/12/2017 **11.30 A.M – 1.30 P.M**

INSTRUCTIONS:

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)

i. Translation

ii. Rotation

iii. 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)

i. Raster Scans displays

ii. 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*** (8 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)
