

**W1-2-60-1-6**

## JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

**UNIVERSITY EXAMINATIONS 2017/2018**

**YEAR 2 EXAMINATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE I GEGIS**

**CIT 2111: INTRODUCTION TO COMPUTER GRAPHICS**

**DATE: JANUARY 2018 TIME: 2 HOURS**

INSTRUCTIONS:

* This paper consists of five questions.
* Answer question one (30 marks) and any other two questions (20 marks)

QUESTION ONE (COMPULSORY)

a) Differentiate between: (10 marks)

i) 2D and 3D

ii) Frame buffer and resolution

iii) Conformal and Afflinx transformation

iv) Computer graphics metafile and programmer’s Hierarchical interactive graphics (PHIC)

v) Pixmap and bitmap

b) State any six (2D computer graphics that are closely related to the six outputs functions of graphic Kernel system (6 marks)

c) Describe the transformation needed to transform the triangle from A to B in figure below (6 marks)

d) Write an open G-L code that whose output is shown below.

QUESTION TWO

a) Explain the application of computer graphics in the following areas:

i) CAD (3 marks)

ii) Presentation graphics (2 marks)

b) Briefly explain the purpose of any four coordinate systems that you encounter in a rendering pipeline (8 marks)

c) Explain orthographic projections by using an example of a diagram of a house (7 marks)

QUESTION THREE

a) Use the Cohen Sutherland algorithm to clip line P, (70, 20) and P2

(100, 10) against a window left corner (50, 10) and upper right corner (80, 40) (11 marks)

b) Explain four major operations that are performed in computer graphics (4 marks)

c) Consider two raster systems with the resolutions of 640x480 and 1280x1024 (i) How many pixels could be accessed per second in each of these systems by a display controller that refreshes the screen at a rate of 60 frames per second (3 marks)

ii) What is the access time per pixel in each system (2 marks)

QUESTION FOUR

a) Draw the shape produced by the open G2 code function below (6 marks)

void display (void)

{

//clear all pixels in frame buffer g/clear (G-L-COLOR-BUFFER-BIT);

g|Color 3F(0.0,0.0, 0.0);

g|Begin (G-L- GUADS);

g|Vertex 2f (300,100);

g|Vertex 2f (100,100);

g|Vertex 2f (200, 0);

g|End (;

g|Flush ();

b) Explain midpoint circle drawing algorithm (8 marks)

c) Using a diagram, explain window to viewport mapping (6 marks)

QUESTION FIVE

a) Define Bresenham algorithm and develop the Bresenham’s line drawing to draw lines of any scope (11 marks)

b) Prove that simultaneous shearing in both direction (x and y) is not equal to the composition of pure shxan along x-axis followed by pure shear along y-axis (5 marks)

c) State any five applications of practical geometry (4 marks)