CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

RESIT/SPECIAL EXAMINATION

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE AND BACHELOR OF SCIENCE IN APPLIED COMPUTER SCIENCE

COSC 371/ACSC 374: COMPUTER SCIENCE

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

DAY/DATE: TUESDAY 02/11/2021 **2.30 P.M – 4.30 P.M.**

INSTRUCTIONS:

Attempt question ONE in section A and any other two questions in section B

SECTION A (30 MARKS)-COMPULSORY

QUESTION ONE

a) Using examples, discuss the following transformations: **[6 marks]**

   i. Reflection

   ii. Shear mapping

b) Define the following terms: **[8 marks]**

   i. Computer graphic.

   ii. Scalar.

   iii. Point**.**

   iv. Line.

c) List FOUR input devices of multimedia. **[4 marks]**

d) Briefly explain the term scan conversion. **[2 marks]**

e) Define refresh frame buffer. **[2 marks]**

f) Define the term aliasing and how to prevent it. **[4 marks]**

g) Differentiate between lossy and lossless compression algorithms. **[4 marks]**

SECTION B: ATTEMPT ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO (20 MARKS)

a) Differentiate between a local illumination model and global illumination model **[4 marks]**

b) Draw a line using the digital Differential analyzer line drawing algorithm starting at point (4,4) and ends at point (12,10) **[8 marks]**

c) Discuss the Cohen- Sutherland line clipping algorithm. **[8 marks]**

QUESTION THREE (20 MARKS)

a) Explain the main functions used in OpenGL. **[8 marks]**

b) Explain the meaning of the term parallel projection and explain where it is most applicable. **[6 marks]**

c) Find the angle between vectors (3, 7) and (-4, 5). **[6 marks]**

QUESTION FOUR (20 MARKS)

a) Differentiate between diffuse reflection and specular reflection. **[4 marks]**

b) i) Derive the following Rotation Identity Matrix: **[4 marks]**

$x' = x \cos(\theta) - y \sin(\theta)$

$y' = x \sin(\theta) + y \cos(\theta)$

ii) Find the transformed point, P', caused by rotating P= (3, 2) about the origin Through an angle of 90°. **[4 marks]**

c) Using a suitable diagram briefly explain the various components and their functions in a CRT. **[8 marks]**

QUESTION FIVE (20 MARKS)

a) Explain the following surface detection methods: **[8 marks]**

i. Z-Buffer Method

ii. Binary Space Partitioning(BSP) Tree Method

b) Draw a circle centered at point (5,5) and has a radius of 6 units using the polar coordinates method **[6 Marks]**

c) Assuming that a certain full-color (24 bit per pixel) RGB raster system has a 512 by 512 frame buffer, how many distinct color choices (intensity levels) would be available? **[6 marks]**
