MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

THIRD YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 305: COMPUTER GRAPHICS

DATE: **TIME:**

INSTRUCTIONS

Answer Question ONE and other TWO Questions

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Articulate the role of frame buffer in Computer graphics. (3 marks)
b) Write a simple program in Open Gl that represent a rectangle. (5 marks)
c) Using a diagram, discuss how Cathode Ray tube works as an output device in computer Graphics. (4 marks)
d) By the aid of a diagram, explain components of the 3D Graphics Pipeline as used in Computer Graphics. (5 marks)
e) Present **THREE** kinds of Lighting as implied in Computer graphics. (3 marks)
f) Distinguish between the 3D model coordinate systems and the 3D world coordinate system. (4 marks)
g) Discuss the model space in projection as implied in the graphics pipeline (4 marks)
h) Describe clipping as implied in computer Graphics. (2 marks)

QUESTION TWO (20 MARKS)

a) By help of a diagram, elaborate how the Shadow-mask CRT functions. (5 marks)
b) Using a generic flat panel display, discuss any **THREE** flat-screen technologies as used in computer graphics. (3 marks)
c) Describe **TWO** characteristics of the Orthographic projections that enables it to be adopted in Computer graphics design instead of Perspective projections (6 marks)

d) Describe **THREE** characteristics of the Perspective projections that enables it to be adopted in Computer graphics design instead of Orthographic projections (6 marks)

QUESTION THREE (20 MARKS)

a) Explain the 3D eye coordinate system as implied in the OpenGL programming. (6 marks)

b) Describe a scene graph as implied in Computer Graphics. (3 marks)

c) Describe **TWO** characteristics of the Orthographic projections that enables it to be adopted in Computer graphics design instead of Perspective projections (4 marks)

d) Illustrate **THREE** characteristics of the Perspective projections that enables it to be adopted in Computer graphics design instead of Orthographic projections (3 marks)

e) Explain the model space in projection as implied in the graphics pipeline. (4 marks)

QUESTION FOUR (20 MARKS)

a) Explain how we (or a camera) view something in the real world as implied in projection of the natural (3D) world onto a two-dimensional space. (4 marks)

b) Elaborate 'display of Information' with relevant instances as an area of application in Computer Graphics. (4 marks)

c) Describe the role of Back-Face Culling also referred to as Back Face Algorithm in computer graphics. (3 marks)

d) Discuss **THREE** kinds of Lighting as implied in Computer graphics. (6 marks)

e) Elaborate the concept of occlusion testing in the context of Back Face Algorithm. (3 marks)

QUESTION FIVE (20 MARKS)

a) Provide **TWO** color model you are familiar with as implied in computer Graphics. (4 marks)

b) Study the picture below. Explain the cause of the problem in the picture and any solution method to correct it. (6 marks)

c) As a component of Back Face Algorithm, explain the role of the painter's algorithm in the visibility of Computer graphics. (4 marks)

d) Explain **TWO** fundamental ways of how the graphics system takes pixels from the frame buffer and displays them as points on the CRT (6 marks)