



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)