



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & IT

UNIVERSITY EXAMINATIONS 2012/2013
FOR THE DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY
(BTIT MAY 2012)

EIT 4214: COMPUTER GRAPHICS

SUPPLEMENTARY/SPECIAL EXAMINATIONS

SERIES: FEBRUARY 2013

TIME: 2 HOURS

INSTRUCTIONS:

- This paper consists of **FIVE** questions
- Answer questions **ONE** and any other **TWO** questions.

This paper consists of Four printed pages.

QUESTION 1

- a) Define the term “Computer graphics”. **(2 marks)**
- b) Outline the role played by Open GL in computer graphics. **(3 marks)**
- c) Explain the following open GL terms:
 - i) FL TK
 - ii) GLUT
 - iii) BOOST
- d) Describe using a diagram, the construction and operation of colored CRT monitor. **(5 marks)**

- e) Give TWO characteristics of each of the following display devices: **(6 marks)**
- i) Plasma
 - ii) LCDs
 - iii) LEDs
- f) Define the following terms: **(5 marks)**
- i) Color model
 - ii) Pixel
 - iii) Vector graphic
 - iv) Raster image
 - v) Virtual reality environment.
- g) List **FOUR** applications of computer graphics in industry. **(4 marks)**

QUESTION 2

- a) Explain the open GL rendering pipeline using a diagram. **(4 marks)**
- b) Sketch **FOUR** types of open GL 3D primitives. **(2 marks)**
- c) Illustrate the following computer graphics objects: **(8 marks)**
- i) Bezier
 - ii) Beziervegon
 - iii) Polygon
 - iv) Wireframe
- d) Write the Bresenham line drawing algorithm. **(6 marks)**

QUESTION 3

- a) Identify **THREE** standard computer graphics formats that are synonymous with the World Wide Web. **(3 marks)**
- b) Distinguish between the RGB color model and the CMYK model clearly stating where each may be used. **(5 marks)**
- c) Differentiate with diagrams, the following types of camera views. **(6 marks)**
- i) One point perspective
 - ii) Two point perspective
 - iii) Isometric view.
- d) i) What does the acronym OLE DB stand for? Outline.
ii) Briefly explain what is OLE DB and why is it important as a data access technology.
iii) Outline the factors that can be used to guide a programmer to choose a specific data access technology. **(13 marks)**

QUESTION 4

- a) Define the following terms: (6 marks)
- i) Euclidean space
 - ii) Parametric surface
 - iii) Computer aided design
- b) Outline **FOUR** advantages of using a CAD program over manual drawing. (4 marks)
- c) Describe the following computer graphics transformation techniques:
- i) Translation
 - ii) Rotation
 - iii) Scaling
 - iv) Reflection
 - v) Shear
- d) Describe with a diagram, the construction and operation of a cathode ray tube. (5 marks)

QUESTION 5

Rendering is the process of generating an image from a model/(or models in what collectively could be called a scene file), by means of computer programs. A scene file contains objects in a strictly defined language or data structure; it would contain geometry, viewpoint, texture, lighting and shading information as a description of the virtual scene.

The data contained in the scene file is then passed to a rendering program to be processed and output to a digital image or raster graphics image file. The term “rendering” may be an analogy with an “artist’s rendering” of a scene. Though the technical details of rendering methods vary, the general challenges to overcome in producing a 2D image from a 3D representation stored in a scene file are outlined as the graphics/pipeline along a rendering device such as GPU.

Many rendering algorithms have been researched and software used for rendering may employ a number of different techniques, scanline reordering, ray tracing and radiosity.

- a) Explain the following rendering terms:
 - i) Texture- mapping
 - ii) Bump-mapping
 - iii) Refraction
 - iv) Diffraction
 - v) Motion blur
 - vi) Photorealistic

- b) Outline the following rendering techniques:
 - i) Rasterization
 - ii) Scanline rendering
 - iii) Ray tracing
 - iv) Radiosity