THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE

FIRST SEMESTER EXAMINATIONS – 2023

FOURTH YEAR BACHELOR IN COMPUTER SCIENCE

CS415 – SPECIAL TOPIC (COMPUTER GRAPHICS)

TIME ALLOWED: 3 HOURS

INFORMATION FOR CANDIDATES

1. Write your name and student number clearly on the front of the examination answer booklet.
2. You have 10 minutes to read this paper. You must not begin writing during this time.
3. This paper contains FIVE (5) questions. You are to **answer ALL** the questions.
4. All answers must be written in examination answer booklets provided. No other written materials will be accepted.
5. Start the answer for each question on a **new** page. Do **not** use red ink.
6. Notes, textbooks, mobile phones and other recording devices are not allowed in the examination room.
7. Scientific and business calculators are allowed in the examination room.
8. A formula sheet and a normal distribution graph are attached.

MARKING SCHEME

Marks are indicated at the beginning of each question. The total is **100 marks.**

QUESTION 1   [2 marks each = 16 marks]

Write a short note about each of the following

     (a) 3 D Object Representation,

     (b) Colour models

     (c) Rendering

     (d) cohen-sutherland algorithm

     (e) Geometric transformation

     (f) Virtual reality different from augmented reality

     (g) Computer Animation languages,

     (h) Virtual Reality

QUESTION 2   [4 + 4 + 4 + 8 marks = 20 marks]

     (a) Discuss about Graphics and Graphics Hardware System with Display Devices, Input and Output Devices.

     (b) What is a sphere and ellipsoid in 3D modeling?

     (c) What is solid modelling in 3D graphics and sweep representation in 3D modelling?

     (d) Describe DDA and Bresenharn's line algorithm Algorithms for drawing 2D Primitives lines.

QUESTION 3   [5 marks each = 20 marks]

     (a) What is Antialiasing and filtering techniques in Computer Graphics.

     (b) Write a detail note about Output Primitives and their uses.

     (c) Clearly describe the Line Drawing Algorithms with analytical methods.

     (d) Write a short note about Introduction of Transformations and give the name of Types of Transformations.

QUESTION 4   [6 marks each = 24 marks]

     (a) What is parallel and perspective projection in 3D transformation? Compare both in tabular format.

     (b) Given a 3D object with coordinate points A (0, 3, 1), B (3, 3, 2), C (3, 0, 0), D (0, 0, 0). Apply the translation with the distance 1 towards X axis, 1 towards Y axis and 2 towards Z axis and obtain the new coordinates of the object.

(c) What are the 3 main components of a 3D polygon mesh?

(d) Write a short note about

    i. What is constructive solid geometry (CSG) and how is it used in 3D modeling?

    ii. File formats for images, Audio and Video.

QUESTION 5   **[10 marks each = 20 marks]**

(a) What are the 5 basic elements of multimedia? Explain in details with example.

(b) Are 3D Visualization and 3D Rendering Different? If 3D Visualization and 3D Rendering are different, explain both and write the relationship between these in details.

END OF EXAM