



**NATIONAL OPEN UNIVERSITY OF NIGERIA**

University Village, Plot 91, Jabi Cadastral Zone, Nnamdi Azikiwe Expressway, Abuja

**FACULTY OF SCIENCES**

**Computer Science Department**

**2023\_1 POP EXAMINATION**

Course Code: **CIT371**

Course Title: **Introduction to Computer Graphics and Animation**

Credit: **3 Units**

Time Allowed: **3 hours**

Instruction: **Answer Questions One (1) and any other THREE (3) questions**

**Question One (25 marks)**

- 1 (a) Describe in detail the different meanings of Computer Graphics. **(3 marks)**
- 1 (b) If vector  $a = [5, 8]^T$  and vector  $b = [6, -2]^T$ ; Calculate
- i. the sum  $a + b$  **(1 mark)**
  - ii. the difference  $a - b$  **(1 mark)**
- 1 (c) Identify three uses of transformation as it relates to rendering in Computer Graphics. **(3 marks)**
- 1 (d) Briefly explain the interfacing between the Central Processing Unit (CPU) and the display. **(4 marks)**
- 1 (e) Write the expression for the explicit, implicit and parametric forms of a line and a circle respectively. **(6 marks)**
- 1 (f) State one difference between antialiasing and direct manipulation. **(2 marks)**
- 1(g) List two (2) types of culling. **(2 marks)**
- 1 (h) What is a raster? List five hard copy raster devices. **(3 marks)**

**Question Two (15 marks)**

- 2 (a) Discuss the origin of Sketchpad. **(2 marks)**

- 2 (b) Outline the various layers that make up the Liquid Crystal Display (LCD). (5 marks)
- 2 (c) Compare the working principles of the Field Emission Devices (FEDs) and the Liquid Crystal Display (LCD). (5 marks)
- 2 (d) List five factors that the perceived colour of an object depends on. (3 marks)

**Question Three (15 marks)**

- 3 (a) Briefly describe the application of Computer Graphics in Medical Imaging and Computer Aided Design (CAD). (2 marks)
- 3 (b) Briefly distinguish between the use of a quadtree and an octree. (3 marks)
- 3 (c) List and then describe briefly any two of the basic line drawing algorithms. (6 marks)
- 3 (d) Outline four characteristics of a vector. (4 marks)

**Question Four (15 marks)**

- 4 (a) Briefly discuss what you understand by interactive Computer Graphics. (4 marks)
- 4 (b) Enumerate the procedures for the construction of Binary Space Partition (BSP) tree. (6 marks)
- 4 (c) What is Bounding Volume Hierarchies (BVH)? (2 marks)
- 4 (d) Briefly explain how light rays can be refracted. (3 marks)

**Question Five (15 marks)**

- 5 (a) (i) What is rendering in Computer Graphics? (2 marks)
- 5 (a) (ii) Enumerate two (2) methods of representing straight lines? (2 marks)
- 5 (b) Discuss the uses of Bounding Volume Hierarchies (BVH). (4 marks)
- 5 (c) Write a short note on the pixel space. (4 marks)
- 5 (d) Briefly describe how the human eye sees the object in front of it. (3 marks)

**Question Six (12 marks)**

- 6 (a) In Computer Graphics rendering, outline the five coordinate systems used.

(5 marks)

6 (b) Describe electromagnetic spectrum in terms of its wave length.

(4 marks)

6 (c) Summarize the properties of the four primary types of printing ink by completing the table below. (

4 marks)

S/N	Dye Colour	Absorbs	Reflects
1.			
2.			
3.			
4.			

6 (d) Determine the magnitude of the following vectors

i.  $q = [3, 4, 5]$

ii.  $r = [6, 9]$

(2 marks)