



NATIONAL OPEN UNIVERSITY OF NIGERIA

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

FACULTY OF SCIENCES
Computer Science Department
2022_2 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 FOUR (4) questions**

Question One (25 marks)

- 1 (a) Describe the operation of a Cathode Ray Tube. **(4 marks)**
- 1 (b) Discuss the application of Computer Graphics in the following areas:
- (i) Scientific Visualisation **(2 marks)**
 - (ii) Medical Imaging **(2 marks)**
 - (iii) Computer-Aided Design (CAD). **(2 marks)**
- 1(c) Enumerate two (2) uses of transformation with regard to graphic rendering. **(2 marks)**
- 1 (d) Describe the interfacing between the Central Processing Unit (CPU) and the display. **(4 marks)**

- 1 (e) Briefly explain the following representations and write the expressions for a line and a circle. (i) Explicit form (ii) Implicit form (iii) parametric form. **(9 marks)**

Question Two (15 marks)

- 2 (a) Describe the term *raster*? List four (4) hard copy raster devices. **(4 marks)**
- 2 (b) Outline the various layers that make up the Liquid Crystal Display (LCD). **(5 marks)**
- 2 (c) Describe the working principles of the following:
- (i) Liquid Crystal Display (LCD) **(3 marks)**
 - (ii) Field Emission Devices (FEDs) **(3 marks)**

Question Three (15 marks)

- 3 (a) Outline four (4) factors that affect the perceived colour of an object. **(4 marks)**
- 3 (b) Given two vectors: $\mathbf{a} = [5, 8]^T$ and $\mathbf{b} = [6, -2]^T$, Calculate:
- i. $\mathbf{a} + \mathbf{b}$
 - ii. $\mathbf{a} - \mathbf{b}$
 - iii. the magnitude of \mathbf{a}
 - iv. $|\mathbf{b}|$
 - v. $3\mathbf{a} - \mathbf{b}$
- (1 mark each – Total = 5 marks)**
- 3 (c) List and then describe briefly any two (2) of the basic line drawing algorithms. **(6 marks)**

Question Four (15 marks)

- 4 (a) Describe three (3) characteristics of a vector. **(3 marks)**
- 4 (b) Outline the procedures for the construction of a Binary Space Partition (BSP) tree. **(6 marks)**
- 4 (c) Discuss two (2) advantages and one (1) disadvantage of the following basic representations of shape.
 - (i) Explicit representation **(3 marks)**
 - (ii) Implicit representation **(3 marks)**

Question Five (12 marks)

- 5 (a) Describe how the refraction of light rays occurs. **(3 marks)**
- 5 (b) Discuss the uses of Bounding Volume Hierarchies (BVH). **(4 marks)**
- 5 (c) Describe 3D camera transforms using camera analogy. **(8 marks)**

Question Six (15 marks)

- 6 (a) Explain briefly how the human eye sees objects. **(3 marks)**
- 6 (b) Outline four (4) coordinate systems used in computer graphics rendering. **(4 marks)**
- 6 (c) Summarize the properties of the four primary types of printing ink by completing the table below.

S/N	Dye Colour	Absorbs	Reflects
1.	Cyan		
2.	Magenta		
3.	Yellow		
4.	Black		

(8 marks)