## 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.    a + b

    ii.    a − b

    iii.    the magnitude of a

    iv.    | b |

    v.    3a − 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)**