NATIONAL OPEN UNIVERSITY OF NIGERIA

PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI, ABUJA

FACULTY OF SCIENCES

DEPARTMENT OF COMPUTER SCIENCE

OCTOBER, 2019 EXAMINATIONS

COURSE CODE: CIT371
COURSE TITLE: COMPUTER GRAPHICS AND ANIMATION
COURSE CREDIT: 3 UNITS
TIME ALLOWED: 2½ HOURS
INSTRUCTION: ANSWER QUESTION 1 AND ANY OTHER FOUR (4) QUESTIONS

Question 1

1. **a**. Define the following:
(i)Dominant wavelength (ii) complementary colours (iii) spectroradiometer (iv) rendering
(v) view frustrum **(5 marks)**

b. Express Affine transformation in:

(i) linear form **(2 marks)**
(ii) matrix form **(2 marks)**
(iii) use homogeneous coordinates to represent the general affine transformation **(2 marks)**

c. (i) List any 5 minimum requirements of graphic tools for the '00' graphicist **(2½ marks)**
(ii) State the snell's law **(2 marks)**

. (iii) Outline any **4** coordinate systems that can be employed in graphics rendering **(2 marks)**

d.(i) State the two basic forms of camera projection and their characteristics **(3 marks)**

(i) Mention 3 strategies to build BV trees **(1½ marks)**

2.a (i) Briefly explain the components of a video interface card (3 marks)

b (i) Briefly describe the layer arrangement of the LCD (3 marks)

(ii) How does LCD work? (3 marks)

(ii) What basic transformation can be applied to say monitor 1 to yield a colour on monitor 2? (3 marks)

3. a(i) How can you achieve bump maps? (2 marks)

(ii). With the aid of a diagram, briefly describe the functionality of a CRT (5 marks)

b. Given that A = $\begin{matrix} 2 & 3 \\ 4 & 5 \end{matrix}$ and B = $\begin{matrix} 6 & 7 \\ 8 & 9' \end{matrix}$

(i) scale A by 5 (1 ½ marks)

(ii) find AxB (1½ marks)

(iii)State the properties of the four primary types of printing ink (2 marks)

4 a. What are the computational issues in using ray tracing to model the properties of global illumination? (3 marks)

b. Given a line with slope m m $\in$ [0 1], a column I and a set pixel (i,j);

(i) Give the expression for the midpoint between these pixel centers (1 mark)

(ii) What does the midpoint value indicate? (2 marks)

c..(i) State the equation of a straight line (1 mark)

(ii)Given that the two points (x0, y0) (x1,y1) define a line, determine the slope and intercept of the two points (5 marks)

5a. Give **2** advantages and **2** disadvantages each of the following:

(i) Explicit representation of curves (2 marks)

(ii) Implicit representation of curves (2 marks)

b. Using Bresenham's Algorithm, illustrate the steps in drawing a line from (1,1) to (6,2) (8 marks)

6. a (i) What do you understand by the BSP tree? (2 marks)

(ii) How can the BSP tree be constructed? (4 marks)

b. (i) How do you perform a 3D rotation about an arbitrary axis (2. ½ marks)

(ii)state two uses of dot product in computer graphics (2 marks)

(iii)State the classifications of graphics input device (1½ marks)