

**National Open University of Nigeria**

**Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja**

**Faculty of Science**

**NOVEMBER, 2018 EXAMINATIONS**

**COURSE CODE:** CIT 371

**COURSE TITLE:** Introduction to Computer Graphics and Animations

**CREDIT: 3 Units**

**TIME ALLOWED: 2½ Hours**

**INSTRUCTION:** **Answer Question ONE (1) and any other FOUR (4) Questions**

**1** a. What is Computer Graphics all about? (3 marks)

b Briefly describe the basic graphics rendering pipeline (4 marks)

c. Why do we want to build a hierarchical data structure such a bounding box hierarchy? (3 marks)

 d. List four graphic hard copy devices (2 marks)

 e. State 3 industries with their possible curve continuity (3 marks)

f. What do you understand by Ray casting (3 marks)
g. Consider a rectangle whose corners are (1, 1), (3, 1), (3, 2) and (1, 2) describe the transformations which would rotate this rectangle by 90o around its centre (4 marks)

(22 marks)

2 a. Describe the main difference between the following two approaches:

(i) bounding volume hierarchy

(ii) hierarchy of splitting planes

(4 marks)

b. Briefly discuss the following

1. BSP trees#
2. Octrees
3. *kd*-trees#
4. Forward mapping
5. Reverse mapping

(8 marks)

(12 marks)

3 a. Using linear systems, list and mathematically define 3 coordinate transformations. (8 marks)

 b. Define aliasing and antialiasing? (4 marks)

 (12 marks)

4. a. Briefly describe the Basic ray casting algorithms (4 marks)

 b. Explain the each of the following forms of continuity:

1. C0
2. C1
3. C∞ (8 marks)

(12 marks)

5 a. Explain the process of mapping image coordinates to the viewport (4 marks)

b. The table below summarizes the properties of the four primary types of printing ink. Fill the missing gap (8 marks)

|  |  |  |
| --- | --- | --- |
| **dye colour**  | **absorbs**  | **Reflects** |
| Cyan  | red  |  |
| Magenta  | green  |  |
| yellow  | blue |  |
| Black  | all  |  |

 (12 marks)

6 a. Consider a rectangle whose corners are (1, 1), (3, 1), (3, 2) and (1, 2) describe the transformations which would rotate this rectangle by 90o around its centre (8 marks)

 b. Draw the RGB colour cube, labelling the corners of the cube and the colour axes.

(4 marks)

 (12 marks)