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| **Unit Code: 05414519A** |
| **Unit Name: APPLY COMPUTATIONAL MATHEMATICS** |
| **APRIL 2025** |
| **Time: 3 Hours** |
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| **KENYA COAST NATIONAL POLYTECHNIC** |
| **KENYA COAST NATIONAL POLYTECHNIC**  **DEPARTMENT OF COMPUTING AND INFORMATICS**  **APPLY COMPUTATIONAL MATHEMATICS**  **LEVEL 5** |
| **WRITTEN ASSESSMENT**  **TIME: 3 HOURS** |
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| **Instructions to student** |
| 1. This paper consists of **EIGHT (8)** questions in **TWO S**ections **A** and **B**. 2. Answer **ALL** questions in section **A and** section **B** in the answer booklet provided. 3. Marks for each question are indicated in the brackets. 4. Do not write on the question paper. |

**SECTION A (40MARKS)**

**Answer all the questions**

1. Convert each of the following numbers to their respective number system equivalent
2. 598710 to Hexadecimal (4marks)
3. C9D16 to Octal (3marks)
4. 65810 to Binary (3marks)
5. Describe each of the following Logic Gates as applied in digital electronics (4 Marks)
6. NAND Gate
7. NOR Gate
8. Draw the logical Symbol of an XOR Gate and Derive its Truth Table with 2 inputs (6 Marks)
9. Figure 1 shows a system that Consist of logic gates use it to answer the questions that follows

(I)

A

(III)

(II)

B

1. Identify The logic gates labeled (I ),(ii) and (iii) (3 Marks)
2. Determine the Boolean Algebra For the System (3 Marks)
3. Draw the truth table to determine the output Q (4 Marks)
4. Perform the Following Binary Arithmetic’s
5. 1110102+ 1110112 (4marks)
6. 3258 - 2138  (3marks)
7. DAC + 2A9 (3marks)

**SECTION B (60marks)**

**Answer all the questions**

1. a ) Explain **FOUR** data collection techniques (8marks)

b) The following data shows the marks scored in computational mathematics test

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| Class | 75-80 | 80-85 | 85-90 | 90-95 | 95-100 | 100-105 | 105-110 | 110-115 |
| Frequency | 9 | 12 | 15 | 11 | 20 | 17 | 14 | 2 |

Determine the (12 marks)

1. Mean
2. Median
3. Standard Deviation
4. a ) Define the following terms as used in set theory; (10marks)
5. Set
6. Empty set
7. Universal set
8. Disjoint set
9. Venn diagram

b ) Given sets A={1,2,3,4} and B={3,4,5,6} and find:

1. A∪B (Union of A and B) (3marks)
2. A∩B (Intersection of A and B) (3marks)
3. A−B (Difference between A and B) (2marks)
4. B−A (Difference between B and A) (2marks)
5. a ) With an example list three types of Matrices (6 marks)

b ) Solve the following pair of simultaneous linear equations, (4marks)

c ) Given matrix and determine;

1. AB; (3marks)
2. A + B ; (2marks)
3. A – B ; (2marks)
4. BTA ; (3marks)