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QUALIFICATION : Bachelor of Regional and Rural Development, Bachelor of Communication, Bachelor of Technology Public Management, Bachelor of Supply Chain Management, Bachelor of Public Management, Bachelor of Office Management and Technology, Bachelor of Natural Resources Management, Bachelor of Emergency Medical Care, Bachelor of Vocational Instructor, Bachelor of Hospitality Management, Nust Bridging Programme, Bachelor of Culinary Arts.	
QUALIFICATION CODE: 07BHOM, 04NBPR, 07BOMC, 07BCNA, 07BRRD, 25BACO, 24BPMA, 07BLSM, 07BOMT, 07BNTC, 24BPMN, 07BRMC	LEVEL: **5**
COURSE: **BASIC MATHEMATICS**	COURSE CODE: **BMS411S**
DATE: **NOVEMBER 2024**	SESSION: **1**
DURATION: **3 HOURS**	MARKS: **100**

FIRST OPPORTUNITY: QUESTION PAPER

EXAMINER: *Mr Jonas Amunyela, Ms Ponhoyomwene Nghishidivali*

MODERATOR: *Mr Simon Kashihalwa*

INSTRUCTIONS:

1. Answer all questions on the separate answer sheet.
2. Please write neatly and legibly.
3. Do not use the left side margin of the exam paper. This must be allowed for the examiner.
4. No books, notes and other additional aids are allowed.
5. Mark all answers clearly with their respective question numbers.

PERMISSIBLE MATERIALS:

1. Non-Programmable Calculator

This paper consists of 5 pages including this front page

(Write down the letter corresponding to the best option for each question)

QUESTION 1 [39 Marks]

1.1 Which of the following numbers is not a prime number? [3]

A. 2 B. 9 C. 3 D. 13

1.2 Decompose 250 into a product of its prime factors [3]

A. 2×5^3 B.$2 \times 25 \times 5$ C. $2^2 \times 5^3$ D. 2×125

1.3 Three bells toll at the intervals of 12, 15 and 24 minutes. All three begin to toll together at 9 a.m. At what time they will again toll together? [3]

A. 11.a.m B. 10.a.m C. 10:45 a.m. D. 8:45 a.m.

1.4 The expression $\frac{9.93\times10^{-3}}{0.23\times10^{5}}$ simplifies to (3.s.f): [3]

A. 1.87×10^5 B. 1.90×10^5 C. 18.733×10^{-7} D. 4.32×10^{-7}

1.5 The expression $-(x^2y^3 - 1)^2 + xy(x^3y^5 - 2xy^2)$.simplifies to: [3]

A.-1 B. $2x^4y^6 - 4x^2y^3 - 1$ C.$-4x^4y^3 - 3x + 4y$ D.1

1.6 Factorize $4y^3 + 12y^2 + 3y + 9$ [3]

A. $(6y - 9a)(4y - 6a)$ B. $(3y + 2b)(2y - 3a)$

C. $(4y^2 + 3)(y + 3)$ D. $3y(2y - 3a) + 2b(2y - 3a)$

1.7 In an Auditorium South the number of boys is three less than four times the number of girls.

Which of the following expressions represent the number of boys in the Auditorium South if the number of girls is n? [3]

A. $3-4n$ B. $4n-3$ C. $n+(4n-3)$ D. $n>(4n+3)$

1.8 Given $x=-2$; $y=\frac{2}{3}$, the expression $4x\left(\frac{y^2}{xy}\right)$ simplifies to: [3]

A. $-21\frac{1}{3}$ B. $21\frac{3}{4}$ C. $\frac{4}{6}$ D. $\frac{-4}{3}$

1.9 The value of x in the equation $3(7+5x)-21=-30$ is: [3]

A. -2 B. -7 C. -49 D. 2

1.10 Luise has 160 copies of a news article. The ratio of the number of Luise's copies to the number of Maggy's copies is $\frac{1}{3}:1$ .How many copies does Maggy have? [3]

A. 480 B. 372 C. 82 D. 744

1.11 If $A=\{2,3,6,7,8,9\}$ and $B=\{11,5,4,1\}$. The set $A\cap B=$? [3]

A. $\{0\}$ B. $\emptyset$ C. $\{1,2,3,4,5,6,7,8,9,11\}$ D. $\{1,2\}$

1.12 Forty workers can paint a wall in eight days. Assume that all workers work at the same pace. How many workers can paint the same wall in 10 days? [3]

A. 16 workers B. 32 workers C. 50 workers D. 120 workers

1.13 Given $A=\begin{pmatrix}2 & 4\\ 1 & 0\end{pmatrix}$, the determinant of A is: [3]

A. -4 B. 4 C. 0 D.8

SECTION B (show all your calculations)

QUESTION 2 **(24 marks)**

2.1 Calculate the highest common factor of 12, 72 and 400 [4]

2.2 Simplify each of the following expressions without using a calculator

2.2.1 $[3(7-2\times4)+9]\times[6-(5+3)]$ [5]

2.2.2 $$\frac{x^{24}y^{8}+x^{7}y^{5}}{x^{7}y^{4}}$$ [4]

2.2.3 $$\frac{12}{y-2}\div\frac{4}{2y-4}$$ [3]

2.3 Mr. David gives half of his salary to his wife and then gives \$3.00 to his last born. Mr David kept \$7.00 to himself.

2.3.1 Write down an equation in terms of x, representing this information. [3]

2.3.2 How much did Mr. David earn? [2]

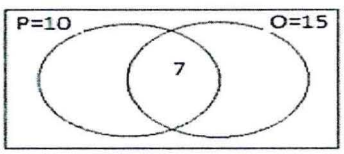
2.4 Solve the following linear equation [3]

$$\frac{x-7}{4}=\frac{x+3}{12}$$

QUESTION 3 **(37 marks)**

3.1 In a survey of 40 students in a class, 10 were fond of having pineapple juice (P), 15 were fond of orange juice (O) and 7 liked to have both pineapple as well as orange juice.

S=40



3.1.1 How many students like pineapple or orange juice? [2]

3.1.2 How many students were taking pineapple juice but not orange juice? [2]

3.1.3 How many students were taking exactly one of the two juices? [2]

3.1.4 How many students were taking neither pineapple juice nor orange juice? [2]

3.2 Let $\Omega = \{1,2,3,4,5,6,7,8,9,10\}$ and $A = \{1,2,3,4,5,6\}$ and $B = \{5,6,7,8,9\}$

Find

3.2.1 $A \cup B$ [2]

3.2.2 $A \cap \bar{B}$ [3]

3.2.3 $\overline{(A \cup B)}$ [2]

3.2.4 $\bar{A} \cap \bar{B}$ [3]

3.3 If $D = \{x: x \text{ is even and } 2 < x \leq 10\}$, list the elements of set D [4]

3.4 Given matrices:

$$A = \begin{pmatrix} 1 & -4 \\ 0 & -2 \end{pmatrix}, B = \begin{pmatrix} 2 & 1 \\ 3 & 0 \end{pmatrix} \text{ and } C = \begin{pmatrix} x & -9 \\ 0 & -2 \end{pmatrix}$$

3.4.1 Find AB [4]

3.4.2 Find the value of x in matrix C if $\det(C) = 10$? [2]

3.4.3 Obtain a matrix $2A - B$ [5]

3.5 Calculate the amount payable for a loan of N$ 3500 for 4 years at the rate of 12% p.a compounded semi-annually. [4]