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QUALIFICATION **VARIOUS**	
QUALIFICATION CODE: **VARIOUS**	LEVEL: **4**
COURSE: **BASIC MATHEMATICS**	COURSE CODE: **BMS411S**
DATE: **JANUARY 2024**	SESSION: **1**
DURATION: **3 HOURS**	MARKS: **100**

SECOND OPPORTUNITY: QUESTION PAPER

EXAMINER: DR JOSUA MWANYEKANGE, MR JONAS AMUNYELA, MR SIMON KASHIHALWA AND MS PONHOYOMWENE NGHISHIDIVALI

MODERATOR: MR GABRIEL MBOKOMA

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.
6. **QUESTION 1** of this question paper entail multiple choice questions with options A to D. Write down the letter corresponding to the best option for each question.
7. **For QUESTION 2, 3 and 4** show clearly all the steps used in the calculations.
8. All written work must be done in blue or black ink and sketches must be done in pencil.

PERMISSIBLE MATERIALS:

1. Non-Programmable Calculator

This paper consists of 5 pages including this front page

Question 1 (26 marks)

Write down the letter corresponding to the best option for each question in the answer booklet/sheet provided.

1.1 Which of the following numbers is not a natural number? (1)

A. 11 **B.** 0 **C.** 1 **D.** 2

1.2 The prime decomposition of 1155 is: (2)

A. $3\times35\times11$ **B.** $3\times5\times7\times11$ **C.** $15\times7\times11$ **D.** 33×35

1.3 What is the Highest Common Factor (HCF) of 42 and 60? (2)

A. 12 **B.** 6 **C.** 4 **D.** 2520

1.4 An atom is 0.00 000 000 025 cm in diameter. Write this figure in standard form. (2)

A. 0.25×10^{9} **B.** 2.5×10^{-10} **C.** 25×10^{-11} **D.** 0.25×10^{-9}

1.5 A man earned N$450 last month and spent $\frac{1}{3}$ of the income on food and $\frac{2}{15}$ on transport.

1.5.1 How much did he spend on transport? (2)

A. N$60 **B.** N$200 **C.** N$95 **D.** N$250

1.5.2 How much did he spend in total? (2)

A. N$210 **B.** N$350 **C.** N$220 **D.** N$60

1.6 When a number is doubled and then added to 20, the result is 140. What is the number? (3)

A. 60 **B.** 120 **C.** 55 **D.** 12

1.7 The expression, $\sqrt{\left(\frac{12}{8}\right)^{-4}}$ simplifies to: (3)

A. $\frac{4}{9}$ **B.** $\frac{3}{2}$ **C.** 44 **D.** $\frac{44}{4}$

1.8 Determine the value of $36(7\times2-17)\div3+24\div3+5$ (3)

A. 4 **B.** -4 **C.** -1247 **D.** -23

1.9 The expression $-1\frac{2}{3}-2\frac{1}{3}$ simplifies to: (3)

A. 4 B. $3\frac{1}{3}$ C. $-3\frac{3}{2}$ D. -4

1.10 Evaluate and simplify $\frac{0.009999+505\times 0+0.990001}{10^{-2}}$ (3)

A. 100 B. 0.001 C. 1 D. 0.01

Question 2 (12 marks)

The answers to this question should be written in the answer booklet/sheet provided. Ensure that all your calculations are shown neatly, systematically and legibly.

2.1 Simplify the following expressions

2.1.1 $\frac{5y^2-y^3}{7y^2-y^3}$ (3)

2.1.2 $\frac{(2a^5b^4c^3)^{-2}}{(3a^3b^{-7}c^{-3})^2}$ (4)

2.2 If your annual salary is N$361 900, how much do you earn per week? (2)

2.3 Thirty men take10 days to dig a trench. Working at the same rate, how long would it take twenty men to dig the same trench? (3)

Question 3 (12 marks)

The answers to this question should be written in the answer booklet/sheet provided. Ensure that all your calculations are shown neatly, systematically and legibly.

3.1 Factorise the expression, $4p^2q^4-4p^2q+4p^3q$ (4)

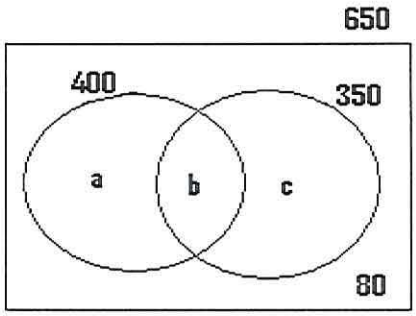
3.2 If $x=-2$ then the expression $\frac{16x}{-3-4x}$ simplifies to: (4)

3.3 Solve the equation, $\frac{x}{3}+\frac{2x}{4}=x-6$ (4)

Question 4 (50 marks)

The answers to this question should be written in the answer booklet/sheet provided. Ensure that all your calculations are shown neatly, systematically and legibly.

4.1 Calculate the values of *a, b and c* in the Venn diagram below. (3)



4.2 Given $A=\{a,b,c,d,e\}$ $B=\{a,d,e,f,h\}$ $C=\{b,c,d,e,f,g\}$

Find:

4.2.1 $A\cap B$ (2)

4.2.2 $(A\cap B)\cup C$ (3)

4.2.3 $p(A\cap B)$ (3)

4.2.4 $A\oplus B$ (3)

4.3 Given vectors $a=(-2 \quad -3)$ $b=\begin{pmatrix}1 & \frac{5}{3}\end{pmatrix}$

Find $-2a-3b$ (4)

4.4 Given a matrix, $A=\begin{pmatrix}-2 & -3\\ 4 & 0\end{pmatrix}$

Find:

4.4.1 $-2A$ (4)

4.4.2 A^2 (4)

4.4.3 $|A|$ (determinant of A) (2)

4.5 Divide 2424 in the ratio of 2 : 3 : 5 (3)

4.6 The price of a car is $N\$105\,000$, this is after a price increase of 25%. What was the price before the increase? (3)

4.7 Calculate the amount payable for a loan of $N\$244\,000$ after 5 years at the rate of 3.75% p.a. compounded quarterly. (4)

4.8 Tangi is four years older than Alen who is 9 years older than Inga. If their combined age is 52 years, find the age of each person. (4)

4.9 Find the value of the letters, a, b, c and d in the matrices given below. (8)

$$\begin{pmatrix} -4a & 2b \\ 4c & 6d \end{pmatrix} - \begin{pmatrix} b & 4 \\ a & 12 \end{pmatrix} = \begin{pmatrix} 22 & 48 \\ -12 & 24 \end{pmatrix}$$

----------END OF EXAMINATION----------