FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES
SCHOOL OF NATURAL AND APPLIED SCIENCES
DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE

QUALIFICATION: Bachelor of Regional and Rural Development, Bachelor of Communication, Bachelor of Technology Public Management, Bachelor of Supply Chain Management, Bachelor of Office Management and Technology, Bachelor of Natural Resources Management, Bachelor of emergency Medical Care, Diploma in Vocational and Training, Bachelor of Tourism management, and Bachelor of Hospitality Management	

QUALIFICATION CODE: 07BRRD, 25BACO, 07BLSM, 07BOMT, 07BNTC, 24BPMN, 07BRCMC	**NQF LEVEL:** 4
COURSE NAME: BASIC MATHEMATICS	**COURSE CODE:** BMS411S
DATE: JULY 2023	**PAPER :**THEORY
DURATION: 3 Hours	**MARKS:** 100

SUPPLEMENTARY / SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	**DR. J MWANYEKANGE,** MR. F NDINODIVA, MR. J AMUNYELA, MR. S. P KASHIHALWA and MS. P NGHISHIDIVALI
MODERATOR:	MR G. MBOKOMA

INSTRUCTIONS	
	1. Answer ALL the questions in the booklet.
	2. **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.
	3. For **QUESTION 2 and 3** show clearly all the steps used in the calculations.
	4. All written work must be done in blue or black ink and sketches must be done in pencil.

PERMISSIBLE MATERIALS

1. Non-programmable calculator without a cover.

THIS QUESTION 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   Determine the value of $10 + \left\{3 \times 5 - 42\left(\frac{2}{9} \times \frac{3}{7}\right)\right\} \div \frac{11}{15}$ (4)

    A. $23\frac{2}{11}$ B. 25   C. $9\frac{6}{11}$ D. $8\frac{1}{15}$

1.2   Given that $30 \leq x \leq 36$ determine the value of x **such that** x **is a:**

1.2.1   Prime number   (1)

    A.   35   B. 33   C. 31   D. 13

1.2.2   Multiple of 8   (1)

    A. 48   B. 32   C. 36   D. 4

1.2.3   Factor of 693   (1)

    A. 3   B. 9   C. 33   D. 30

1.2.4   A perfect square   (1)

    A. 36   B. 30   C. 100   D. 32

1.3   Evaluate $(50xy)^{\frac{1}{2}} \times x^{-\frac{1}{2}}$, given that $x = 9$ and $y = 2$.   (3)

    A.   10   B. 90   C. 900   D. 450

1.4   The number 1998 can be written as $2 \times 3^{n} \times p$, **where n is a whole number and p is a prime number.** Work out the values of n and p.   (3)

    A. $n = 3; p = 37$ B. $n = 4; p = 37$ C. $n = 2; p = 111$ D. $n = 2.5; p = 64$

1.5   Solve for x in: $3(x+4) - 2 = 16 - (x+8) - 2$.   (3)

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

1.6   Factorise $6x^2 - 9ax + 4bx - 6ab$ (3)

    A. $(3x + 2b)(2x - 3a)$ B. $(6x - 9a)(4x - 6a)$ C. $6(x^2 - ab) - x(9a - 4b)$

    D. $3x(2x - 3a) + 2b(2x - 3a)$

1.7 If **A** represents the number of apples bought at N$1.50 each and **B** represents the number of bananas bought at N$1.00 each, which of the following expressions below represents the total cost of buying the apples and bananas in cents? (3)

A. 25(A+B)   B. A+B   C. 1.5A+B   D. 150A+100B

1.8 Determine the values of **a, b, and k** given that

$$\begin{pmatrix} 4 & b \\ a & 2 \end{pmatrix} + k\begin{pmatrix} 3 & 1 \\ 0 & -2 \end{pmatrix} = \begin{pmatrix} 10 & 6a \\ 4 & -2 \end{pmatrix}$$ (3)

A. $a = 4; b = 26; k = -2$ B. $a = 4; b = 22; k = 2$ C. $a = 4; b = 22; k = -2$

D. $a = 2; b = 22; k = 2$

Question 2 (20 marks)

2.1. Simplify each of the following expressions as much as possible.

2.1.1 $-xy - 4ws + xy + 2ws + 2ws - 5$ (4

2.1.2 $5a^2 - 2ab - 3a^2 - 6bc - 4a^2 + 2ba$ (4)

2.1.3 $\dfrac{8m^2 + 40m}{8m}$ (3)

2.2. Expand and simplify the expression $(x - y)^2(y - x)^2$ (3)

2.3 Factorize the following:

2.3.1 $a^3 - a + a^2c - c$ (3)

2.3.2 $4x^2 - 6xy + 6xk - 9yk$ (3)

Question 3 (54 marks) [show all your working]

3.1 Given that $A = \begin{pmatrix} 2 & -4 \\ 4 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 4 & -3 \\ 1 & 0 \end{pmatrix}$, calculate:

3.1.1 2A-3B (6)

3.1.2 BA (4)

3.1.3 Determinant of matrix B (3)

3.2 Given that:
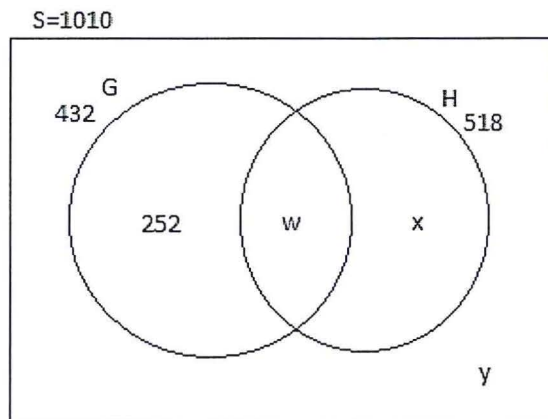
3

$A = \{1, 2, 3, 6, 7, 14, 21, 42\}; \ B = \{2, 3, 5, 7, 11, 17, 19\}; \ C = \{1, 3, 5, 6, 7, 9, 12\}$

Determine the set

3.2.1 $A \cap B \cap C$ (2)

3.2.2 $B \oplus C$ (4)

3.3 Consider the Venn diagram below and determine the values of w, x and y. (3)

S=1010

3.4 Represent this information on a Venn diagram. (4)

3.4.1 How many of the International students were not married? (3)

3.4.2 How many of the International students were female? (3)

3.4.3 Express the number of international married students as fraction of the international students in the lowest terms. (2)

3.5 It takes Mrs Shimbi and her son 10 weeks to plough their Mahangu field. Due to bad health she has decided to employ some workers to help them with the fields. If she wants the field to be ploughed in 4 weeks how many **additional** men should she employ? (4)

3.6 Susan bought a television on sale for N$1400. This was 70% of its original price. What was the original price of the television? (4)

3.7 Mr. Jonas opens an education trust fund for his three daughters, Mercy, Jane and Patty, for future college fees with an initial amount of N$350000. This amount earns Simple Interest at a rate of 15% for 10 years.

3.7.1 How much will be in the trust fund after 10 years? (4)

3.7.2 If Mercy, Jane and Patty are given the money in the ratio 5:3:2 respectively, after the 10 years has elapsed, how much will Jane receive? (2)

3.8 Mr. Joseph invests N$ 7500 in an investment account. The bank offers him 5.5% interest **compounded monthly**. If Mr. Joseph decides to withdraw from this account only after 6 years, how much will he have in his account? (4)

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