NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

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
SESSION: NOVEMBER 2022	**PAPER :**THEORY
DURATION: 3 Hours	**MARKS: 100**

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER

EXAMINER:	DR. J MWANYEKANGE, MR. J AMUNYELA and MS. P NGHISHIDIVALI
MODERATOR:	MR G. MBOKOMA

INSTRUCTIONS

1. Answer ALL the questions in the booklet provided.
2. Show clearly all the steps used in the calculations.
3. 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(20 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 $10+\left[2\times 5-42\left(\frac{2}{9}\times\frac{3}{7}\right)\right]\div\frac{11}{15}$ (2)

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

1.2 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

1.3 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. $n=2.5;p=64$

1.4 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. $x=4$

1.5 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. $3x(2x-3a)+2b(2x-3a)$

1.6 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

1.7 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 (24 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 Evaluate the following:

2.1.1 $\sqrt[4]{\frac{82944}{4}} \div \frac{4^{-2}}{2^{-4}}$ (3)

2.1.2 $-\frac{1}{3^{-3}} - [-(-2^2)] + \sqrt[3]{-27}$ (3)

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

2.2.1 $-xy - 4ws + xy + 2ws + 2ws - 5$ (3)

2.2.2 $5a^2 - 2ab - 3a^2 - 6bc - 4a^2 + 2ba$ (3)

2.2.3 $\frac{8m^2 + 40m}{8m}$ (3)

2.3 Solve the following linear equations

2.3.1 $\frac{x}{5} + 1 = 2x - \frac{3}{7}$ (3)

2.3.2 $3(2x - 5) = 7$ (3)

2.4 Factorize $rq + pq^2 - rs - pqs$ (3)

Question 3 (16 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 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 (2)

3.2 If the determinant of the matrix $\begin{pmatrix}9 & 3x-3\\ -4 & 2x-1\end{pmatrix}$ is 0, determine the value of x.(4)

Question 4 (17 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 Given that:

$$A=\{all\ \ factors\ of\ 42\};\ B=\{all\ \ prime\ numbers\ less\ than\ 20\};C=\{1;3;5;6;7;9;12\}$$

Determine the set

4.1.1. $A\cap B\cap C$ (3)

4.1.2 $B\oplus C$ (4)

4.2 A survey was carried out at a certain university to find out how many of the International students were married. Of the 2100 International students approached, 1105 of them were male and 600 of them were married. 305 of the International students were married male students.

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

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

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

Question 5 (23 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

5.1 Mr. Xuang made some fat cakes. He sold $\frac{3}{5}$ of them at his Cuca shop and gave $\frac{1}{4}$ to his neighbours children.

5.1.1 What fraction of the fat cake is left? (3)

5.1.2 If he had 30 fat cakes left, how many of them did he sell? (3)

5.2 Mr. Swartz 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.

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

5.2.2 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)

5.3 Mrs. James decides to invest her money for 12 years to raise money for her daughters' university education. The bank offers her an interest of 9.5% compounded quarterly for the first 8 years and then an interest of 12% compounded semi-annually for the last 4 years.

5.3.1 How much money will Mrs James have in her account after 8 years if she invests N$5000? (5)

5.3.2 How much will be available for her daughter's university education after 12 years correct to 2 decimal places? (6)

END OF EXAMINATION