ΠΑΜΙΒΙΑ UΠIVERSITY
OF SCIEΠCE AΠD TECHΠOLOGY

FACULTY OF HEALTH AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

QUALIFICATION: Bachelor of Technology: Geo-Information Technology, Bachelor of Human Resources Management, Bachelor of Marketing, Bachelor of Transport Management, Bachelor of Business Administration, Bachelor of Agricultural Management, Bachelor of Horticulture	
QUALIFICATION CODE: 07BGIT,07BHRM,07BMAR,07BBAD,27BAGR,07BTRM	**NQF LEVEL:** 5
COURSE NAME: INTRODUCTION TO MATHEMATICS (BUSINESS AND MANAGEMENT)	**COURSE CODE**: ITM111S
SESSION: JANUARY 2020	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINERS	Ms A. SAKARIA, Ms S.Mwewa, Mr B. Obabueki
MODERATOR:	Mr G. TAPEDZESA

INSTRUCTIONS
1. Answer ALL the questions in the booklet provided.
2. Show clearly all the steps used in the calculations.
3. Marks will not be awarded for answers obtained without showing the necessary steps leading To them (the answers).
4. All written work must be done in blue or black ink and sketches must be done in pencil.
5. You may not start to read the questions printed on the subsequent pages of this question paper until instructed that you may do so by the invigilator.

PERMISSIBLE MATERIALS
1. Non-programmable calculator without a cover.

This question paper consists of 5 pages (including this cover page)

SECTION A (Multiple choice)

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

QUESTION 1 [36 Marks]

1.1 Mr. Hansen's annual salary was $N\$ 282\,000$ in the year 2004. In 2005 his salary was increased by 12.5% and in 2006 his monthly salary increased to $N\$ 28\,645.03$. From the information above, determine:

    1.1.1 Mr. Hansen's monthly salary in 2005.   [3]

    A. $N\$2\,643.50$ B. $N\$35\,250.00$
    B. $N\$317\,250.00$ D. $N\$26\,437.50$

    1.1.2 The percentage increase for 2006.   [3]

    A. 8.34%   B. 1.835%   C. 0.0835%   D. 8.35%

    1.1.3 His total income for the three years.   [3]

    A. $N\$78\,582.53$ B. $N\$942\,990.36$ C. $N\$942\,970.00$ D. $N\$660\,990.38$

1.2 Simplify $7^{-1} \times 17^0 \times 49^{\frac{3}{2}}$ [3]

    A. 8403.5   B. 18.52   C. 47   D. 49

1.3 An amount of $N\$508070.00$ can be expressed in standard form as: [3]

    A. $N\$5.08070 \times 10^5$ B. $N\$508.070\,x \times 10^3$

    C. $N\$5080.70 \times 10^2$ D. $N\$5.08070 \times 10^{-5}$

1.4 Evaluate and simplify $\dfrac{0.009999 + 505 \times 0 + 0.99001}{10^{-2}}$ [3]

    A. 100.0009   B. 0.001
    C. 1   D. 0.01

1.5 If the matrix $\begin{pmatrix} 4x & -16 \\ -4 & 8 \end{pmatrix}$ has no inverse the value of x is: [3]

A. 24   B. $2x$ C. 2   D. 0

1.6 Factorize the expression $y - x - xy + x^2$ [3]

A. $(x - y)(1 - x)$ B. $(x - y)(x - 1)$ C. $(x + 1)(y - x)$ D. $(y - x)(1 - x)$

1.7 The solution of the linear equation $\frac{5x}{2} - \frac{2x}{3} - 4 = -5$ is: [3]

A. $x = \frac{1}{11}$ B. $x = -\frac{6}{11}$ C. $x = -\frac{19}{11}$ D. $x = -\frac{1}{11}$

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

A. -20   B. 2   C. -34   D. 0

1.9 What is the sum of the series $\sum_0^5 (n^3 + 3)$ [3]

A. 128   B. 131   C. 240   D. 243

1.10 Which of the expressions below represents the following statement?   [3]

A. $x = 2y - 5$ B. $y = 2x + 5$ C. $y = 2x - 5$ D. $x = 2x + 5$

QUESTION 2 [15 Marks]

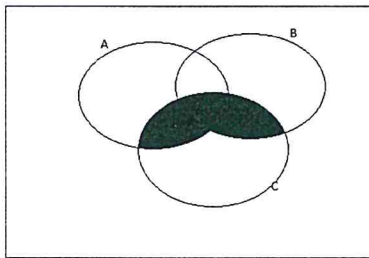2.1 It took thirty men 10 days to dig a trench. Working at the same rate, how long would it take twenty men to dig the trench?   [3]

A. $6\frac{2}{3}\ days$ B. $60\ days$ C. $15\ days$ D. $7\ days$

2.2 Determine the value of $\frac{(120\div-2)}{(16-28)}+6-3(3\times 2)$ [3]

A. -43.75 B. -17 C. -7 D. 17

2.3 From the Venn Diagram below, describe the shaded region.   [3]

A. $A\cup B\cup C$ B. $A\cap B\cap C$ C. $(A\cup B)\cap C$ D. $(A\cap B)-C$

2.4 Determine the value of n that makes the ratio $n:15$ the same as the ratio $36:90$.   [3]

A. $n=1350$ B. $n=5$ C. $n=10$ D. $n=6$

2.5 Mr. Titus buys x cans of cool drink at $N\$5.00$ each and another $(x+5)$ cans of juice at $N\$6.50$ each. The total cost was $N\$\ 67$. How many cans of juice Mr. Titus bought?   [3]

A. 20   B. 3   C. 12   D. 8

4

SECTION B (Clearly show all your work)

QUESTION 3 (49 MARKS)

3.1 Expand and simplify the expressions:

3.1.1 $(x - xy)^2 - x^2 - x(-2xy)$ [3]

3.1.2 $3x(x - 3) + x(x - 2)$ [3]

3.2 If the universal set $= \{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15\}$, set $A = \{2,3,4,5,6,7,8\}$, set $B = \{5,8,9,11,14\}$, $D = \{2,3\}$, find:

3.2.1 $A \cap B$ [2]

3.2.2 $n(A \cap B)$ [1]

3.2.3 $A \cup B$ [4]

3.2.4 $(A \cup B)^c$ [4]

3.3 Given the matrices $A = \begin{bmatrix} 5 & 2 \\ 1 & 1 \end{bmatrix}$, $B = \begin{pmatrix} 1 & 0 \\ -3 & -6 \end{pmatrix}$ Find:

3.3.1 AA^{-1} [6]

3.3.2 $2A - B$ [5]

3.4 Of the 60 students (S) in class, 44 can spell the word 'Parallel' (PA), 22 can spell 'Pythagoras' (PY) and 14 can spell neither.

3.4.1 Present this information in a Venn diagram. [5]

3.4.2 How many students can spell both words? [4]

3.4.3 How many students can spell Parallel or Pythagoras? [3]

3.5 Given the formula, $S = \frac{n}{2}[2a_1 + (n - 1)]d$ find the sum of the first 102 terms of the series

$9 + 19 + 29 + \cdots$ [5]

3.6 Calculate the amount payable for a loan of $N\$ 1000$ for 3 years at the rate of 10% p.a. compounding annually. [4]

END OF QUESTION PAPER