



**PAMIBIA UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

**FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES**

**DEPARTMENT OF MATHEMATICS AND STATISTICS**

<b>QUALIFICATION:</b> 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	
<b>QUALIFICATION CODE:</b> 07BGIT,07BHRM,07BMAR,07BBAD,27BAGR,07BTRM,07BHOR	<b>NQF LEVEL:</b> 5
<b>COURSE NAME:</b> INTRODUCTION TO MATHEMATICS (BUSINESS AND MANAGEMENT)	<b>COURSE CODE:</b> ITM111S
<b>DATE:</b> JANUARY 2023	<b>PAPER :</b> THEORY
<b>DURATION:</b> 3HOURS	<b>MARKS:</b> 100

<b>SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER</b>	Ms A. SAKARIA, Ms Y. NKALLE, Ms P. NGHISHIDIVALI, Mr B. OBABUEKI, Mr F. NDINODIVA
<b>MODERATOR:</b>	Mr I. NDADI

<b>INSTRUCTIONS</b>
<ol style="list-style-type: none"><li>1. Answer ALL the questions in the answer sheet.</li><li>2. <b>QUESTION 1</b> 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.</li><li>3. For <b>QUESTION 2</b> indicate whether the given mathematical statements are true (T) or false (F).</li><li>4. <b>QUESTION 3</b> show clearly all the steps used in the calculations.</li></ol>

**PERMISSIBLE MATERIALS**

1. Non-programmable calculator without a cover.

**THIS QUESTION PAPER CONSISTS OF 4 PAGES** (Including this front page)

**QUESTION 1 [30 MARKS]**

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

1.1 Evaluate  $\left[ \frac{105}{3.5} - \frac{\sqrt[4]{6561}}{3} \right]^3$  and leave your answer correct to 3 significant figures. [3]

- A. 27                                      B. 19683                                      C. 19700                                      D. 197

1.2 An AP (Arithmetic Progression) is 8, 5, 2, -1, ... Find the 50<sup>th</sup> term. [3]

- A. 299                                      B. -139                                      C. -380                                      D. 100

1.3 Find the Lowest Common Multiple (LCM) of the numbers 255, 105 and 90 [3]

- A. 5355                                      B. 255                                      C. 1025                                      D. 10710

1.4 A group of workers is digging a trench. When there are 6 workers, the length of the trench they can dig is 18 meters in 1 day. All the workers dig at the same rate.

1.4.1 Work out the length of the trench 1 worker could dig in 1 day. [3]

- A. 4m                                      B. 3m                                      C. 0.33m                                      D. 6m

1.4.2 A team of workers digs 12 meters in 1 day. How many workers are in this team? [3]

- A. 3                                      B. 2                                      C. 4                                      D. 6

1.5 Evaluate  $\log_2 16 + \log_3 27 + \log 1$ . [3]

- A. 4                                      B. 3                                      C. 7                                      D. 8

1.6 Kiito earned N\$1450 last month and spent  $\frac{2}{3}$  of the income on food and  $\frac{1}{5}$  of the remaining amount on transport. How much did he spend on transport? [3]

- A. N\$290.00                                      B. N\$90.00                                      C. N\$966.67                                      D. N\$96.67

1.7 Five years ago, a man was seven times as old as his son. In five years time, the man will be three times as old as his son. How old are father and son now? [3]

- A. Father is 40 years old, and the son is 5 years old.
- B. Father is 40 years old, and the son is 10 years old.
- C. Father is 96 years old, and the son is 13 years old.
- D. Father is 91 years old, and the son is 8 years old.

1.8 Factorize the expression  $xs - xt - ys + yt$  [3]

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

1.9 Determine the sum of the series  $\sum_{n=1}^5 (1+n)$ . [3]

- A. 6                                  B. 17                                  C. 20                                  D. 25

**QUESTION 2 [10 MARKS]**

Indicate whether each of the given mathematical statements is true (T) or false (F)

2.1 The number  $0.51 \times 10^{-3}$  is in standard form. [2]

2.2 The expression  $(x+2)^3$  simplifies to  $x^3 + 2^3$ . [2]

2.3  $\log_5 4 = \frac{\log_{10} 4}{\log_{10} 5}$  [2]

2.4 The discriminant of the equation  $2x^2 - 4x + 9 = 0$  is negative. [2]

2.5 If A and B are both  $2 \times 3$  matrices then, we can calculate  $AB$ . [2]

**QUESTION 3 [60 MARKS] (Clearly show all your work)**

3.1 Let  $S = \{21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31\}$ ,  $A = \{21, 22, 23, 26, 27, 30\}$ ,  
 $B = \{22, 23, 26, 29, 30\}$ ,  $C = \{23, 25, 27, 29, 30\}$  find:

3.1.1  $B \cup (A \cap C)$  [4]

3.1.2  $A^c \cap B$  [4]

3.1.3  $A - C$  [2]

3.1.4  $A \oplus B$  [6]

3.1.5 The number of elements in the power set  $P(B \cap C)$  [3]

3.2 Let  $A = \begin{pmatrix} -3 & 2 \\ -1 & 3 \end{pmatrix}$ ,  $B = \begin{pmatrix} -3 & -5 \\ -4 & -1 \end{pmatrix}$  and  $C = \begin{pmatrix} 0 & 2 \\ 1 & 3 \end{pmatrix}$ , find:

3.2.1  $A - C$  [4]

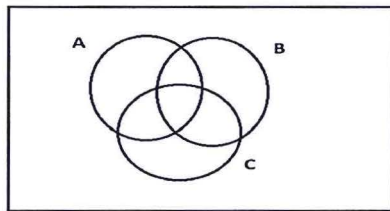
3.2.2  $B^2$  [4]

3.2.3  $A^{-1}$  [6]

3.3 Determine the type of solution for the quadratic equation  $2x(x+1) + 2x = 4^2$  and then solve the equation by factorization. [7]

3.4 Solve the inequality,  $3x - 3 \geq x + 5 \geq 2x - 1$  and show the results on a number line. [6]

3.5 Copy the Venn diagram below and shade the region  $A^c \cap (B \cup C)$ . [3]



3.6 The maturity value of a loan of N\$350000.00 is N\$402500.00. Calculate the annual simple interest rate if the loan takes 5 years to mature. [5]

3.7 What sum of money will N\$350.00 grow to if it is invested for 5 years at 9% per annum compounded semi-annually? [6]

**END OF EXAMINATION QUESTION PAPER**