



PAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

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| QUALIFICATION: Diploma in Business Process Management (CATS Programme) | |
| QUALIFICATION CODE: 06DBPM | LEVEL: 6 |
| COURSE: INTRODUCTION TO MATHEMATICS | COURSE CODE: ITM 511C |
| DATE: NOVEMBER 2019 | SESSION: 1 |
| DURATION: 3 HOURS | MARKS: 100 |

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| 2nd OPPORTUNITY EXAMINATION | |
| EXAMINER | MS. L. SAUTI |
| MODERATOR | MR. A. ROUX |

THIS QUESTION PAPER CONSISTS OF 5 PAGES
(Including this front page)

INSTRUCTIONS

1. Answer all the questions and number your solutions correctly.
2. **Question 1** of this question paper entails multiple choice questions with options A to D. Write down the letter corresponding to the best option for each question. For **Question 2 and 3** you are required to show clearly all the steps used in the calculations.
3. All written work **MUST** be done in blue or black ink.
4. Untidy/ illegible work will attract no marks.

PERMISSIBLE MATERIALS

1. Non-programmable calculator without the cover.

QUESTION 1

[30 MARKS]

1.1 Simplify the following: $9 - 2(x - 5) = x + 10$

- A. -3
- B. 3
- C. 29
- D. -29 [3]

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

- A. -20
- B. 20
- C. -3
- D. 3 [3]

1.3 The algebraic expression: $6ax - 24ay + 4bx - 16by$ simplifies to:

- A. $(6a - 4b)(x - 4y)$
- B. $(6a + 4b)(x + 4y)$
- C. $(6a + 4b)(x - 4y)$
- D. $(4a - 6b)(4x - y)$ [3]

1.4 A furniture store buys a chair for N\$240 from a factory. They add 75% mark-up and also 15% VAT. What is the price that you will pay for it at a "25% less" sale?

- A. N\$60.75
- B. N\$290.00
- C. N\$325.50
- D. N\$362.25 [3]

1.5 How long will an investment take to double its value at an interest rate of 10.5% p.a if compounded annually?

- A. *6.9 years*
- B. *7 years*
- C. *25.8 years*
- D. *4.3 years* [3]

1.6 Find the set of values of x for which $2(3x + 4) > 1 - x$

- A. $x > 1$
- B. $x > -1$
- C. $x > 2$
- D. $x > -2$ [3]

1.7 Solve the matrix equation for x and y in $2 \begin{bmatrix} 1 & 5 \\ 3 & -2 \end{bmatrix} - \begin{bmatrix} -2 & 1 \\ 1 & -3 \end{bmatrix} = \begin{bmatrix} x & 9 \\ 5 & y \end{bmatrix}$

A. $x = 4$ and $y = -1$

B. $x = 4$ and $y = 1$

C. $x = -4$ and $y = -4$

D. $x = -4$ and $y = -1$ [3]

1.8 Determine the following : $\left(3\frac{1}{3} - 2\frac{1}{2}\right) \div 1\frac{1}{4}$

A. $\frac{2}{3}$

B. $\frac{3}{2}$

C. 0.66

D. 0 [3]

1.9 Find the HCF of 50, 135, and 75

A. 25

B. 10

C. 15

D. 5 [3]

1.10 Naomi estimates that she will need N\$ 40 000 in 4 years' time to buy a new car, assuming a reasonable trade-in price for her old car. She has N\$ 16 000 which she can put into the bank earning 4.5% p.a. interest compounded semi-annually. How much will she earn on this investment?

A. N\$19117.30

B. N\$19080.30

C. N\$19000.00

D. N\$20000.00 [3]

QUESTION 2

[30 MARKS]

2.1 Evaluate the following: $\frac{1}{5} \div \frac{4}{5} + \frac{3}{5} \div \frac{9}{25} \left(\frac{1}{3} - \frac{2}{5}\right)$ [4]

2.2 Simplify the following algebraic expression:

$$\frac{25ab^2-15a^2b}{40ab^2-24a^2b}$$
 [5]

2.3 Given: $C = \begin{bmatrix} 0 & -4 \\ 3 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 12 & 9 \\ 3 & -3 \end{bmatrix}$

2.3.1 Find the values in matrix $A = C^2 - C$

2.3.2 Find $B^{-1} C^{-1}$ [9]

2.4 In a class of 68 students (ST), there are 33 boys (B) and 16 of these Boys can swim (S). In total, 38 students can swim.

2.4.1 Draw a Venn diagram to represent the information given above. [4]

2.4.2 How many girls in the class cannot swim? [3]

2.5 Given matrix $C = \begin{bmatrix} 2 & e \\ ak & 3 \end{bmatrix} + k \begin{bmatrix} 3 & 1 \\ 0 & -2 \end{bmatrix} = \begin{bmatrix} 8 & 6a \\ -6 & -1 \end{bmatrix}$;

Find the values of a, e and k. [5]

QUESTION 3

[40 MARKS]

3.1 Moses is expecting to earn a bonus at the end of the year, so he is also considering borrowing the N\$30 000 from his bank. The bank allows him to repay the loan with one payment at the end of 1 year. Interest is charged at 10% per annum, compounded quarterly. Determine how much he will have to repay. [3]

3.2 Solve the following inequality: $\frac{a-3}{2} - \frac{1}{3}(6 + 5a) > \frac{13a-6a}{3}$ [3]

3.3 There is a linear relationship between the price of tricycles (**p**) at Frieda's baby shop and the number sold (**x**), where **(p = ax + b)**. At N\$1 500 she sells 20 tricycles per week, but only half this number when she increases the price by N\$500.

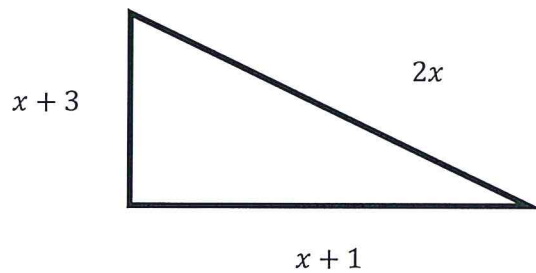
3.3.1 Find a, b and write down the complete equation.

3.3.2 What price will ensure the sales of 25 tricycles?

3.3.3 How many tricycles can be sold at N\$1 000?

3.3.4 What is the maximum possible price? [11]

3.4 The triangle below has the following measurements:



3.4.1 Find the value of x .

3.4.2 Find the value of the three sides.

3.4.3 Find the perimeter of the triangle.

3.4.4 Find the area of the triangle. [12]

3.5 Two groups of students went on a bicycle tour from Windhoek to Katima Mulilo (1200 km). The first group cycled 40 km the first day and every day later they increased the distance by 3 km. The second group cycled 30 km the first day and every day later increased the distance by 10%.

3.5.1 How far did each group cycle on the 10th day?

3.5.2 How far from Windhoek was each group after 15 days?

3.5.3 How many kilometres is the second group left with to reach Katima? [11]

=====END OF EXAMINATION=====