



NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

QUALIFICATION: Diploma in Business Process Management (CATS Programme)	
QUALIFICATION CODE: 06DBPM	LEVEL: 6
COURSE: INTRODUCTION TO MATHEMATICS	COURSE CODE: ITM 111S
DATE: NOVEMBER 2018	SESSION: 1
DURATION: 3 HOURS	MARKS: 100

2nd OPPORTUNITY EXAMINATION	
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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 Evaluate the following:

1.1.1 $2\frac{1}{4} - 1.\bar{6} \times 0.75$

A. $\frac{21}{20}$

B. $\frac{7}{16}$

C. 1

D. $\frac{207}{200}$ [3]

1.1.2 $\sqrt[3]{7^3} \div \sqrt{7^5} \times \sqrt{7^6}$

A. 49

B. 33.20

C. 2401

D. 3.21 [3]

1.2 The algebraic expression: $\frac{x^2}{2x^2-x-6}$ simplifies to:

A. $\frac{(x-2)(x+2)}{(2x+3)(x-2)}$

B. $\frac{(x+2)(x+2)}{(2x-3)(x-2)}$

C. $\frac{(x+2)}{(2x+3)}$

D. $\frac{1}{x}$ [3]

1.3 Determine the sum to be invested for 4 years at 12.5% per annum compounded monthly to amount to N\$65 000 at the end of the investment

A. N\$39 526.59

B. N\$106 890.83

C. N\$40 579.18

D. N\$40 000.00 [3]

1.4 Edgars Stores bought new dresses in South Africa for N\$840 each. Before selling them to the public, they put a 150% mark up, added 15% VAT and deducted 25% discount as they were soiled by the heavy rains in Cape Town. How much did Nahole buy this dress from Edgars?

A. N\$792.75

B. N\$1 811.25

C. N \$ 1 496.25

D. N\$1 086.75 [3]

1.5 Determine the length in metres of the following measurements:

$$350 \text{ mm} + 324 \text{ cm} + 19.41 \text{ m} + 0.027 \text{ km}$$

- A. 35919.41 m B. 296.15 m
C. 693.44 m D. 50 m [3]

1.6 If $x = -3$; $y = \frac{1}{2}$; and $z = -\frac{1}{2}$; determine the following:

1.6.1 $\sqrt{6yz + 3xz}$

- A. 1.73 B. 2.45
C. $\sqrt{3}$ D. 0 [3]

1.7 Solve the following inequality:

$$\frac{2-3x}{5} < x + 2$$

- A. $x < 0$ B. $x < -1$
C. $x > -1$ D. $x > 0$ [3]

1.8 If $A = \begin{bmatrix} 2 & 6 \\ 0 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2x & 0 \\ 2 & 6 \end{bmatrix}$

1.8.1 determine the value of x .

- A. 1 B. 0
C. 2 D. 4 [3]

1.9 Solve the following logarithm: $\log_2 32 - \log_2 16$

- A. 1 B. 2
C. 32 D. 16

QUESTION 2**[35 MARKS]**

2.1 Remove brackets and simplify the following algebraic expression:

$$2x^2y^3(3x - 4y)^2 - 2x^2y^3(3x - 4y)(3x + 4y) - 16x^2y^4(2y - 3x) \quad [6]$$

2.2 Factorise the following by grouping:

$$8x^3 - 12x^2y - 18xy^2 + 27y^3 \quad [4]$$

2.3 Given points $A(-4; 9)$; $B(4; -3)$; and $C(-6; -1)$

2.3.1 Find the equation of line AB.

2.3.2 Find the length of the segment AB.

2.3.3 Find the equation of the line parallel to AB through point C.

2.3.4 Find the equation of the line perpendicular to AB through point C. [12]

2.4 Out of 720 students interviewed, it was found that 370 speak Afrikaans (A), 110 speak neither Afrikaans nor Oshiwambo, (O). Furthermore, $(x + 14)$ speak Oshiwambo only and x speak both languages.

2.4.1 Draw a Venn diagram to represent the information given above. [5]

2.4.2 Solve for x . [3]

2.4.3 Determine the number of students who speak Afrikaans only. [2]

2.5 How long will an investment double its value at an interest rate of 11.5% p.a compound interest? [3]

QUESTION 3**[35 MARKS]**

3.1 Formulate and solve the following word problem:

When half a number is subtracted from double the number the answer is one more than the number. What is that number? [3]

3.2 Find the term of this sequence 15; 12; 9;..... which is equal to -39 ? [3]

3.3 Johnson saves N\$500 the first month and every month later N\$100 more De Clerk starts with N\$500, but increases the amount by 10% each month. Shindodola saves N\$10 000 the first month and every month later

20% less. Who will have more after 1½ years later and how much more? [10]

3.4 Some Mathematics teachers at NUST went with their students to Groove Mall for a movie night. One group comprised of 5 teachers and 5 students and they paid N\$1 250 for their tickets. The second group comprised of 3 teachers and 2 students and they were charged N\$650. Determine the cost paid by one teacher and one student using Cramer's rule. [7]

3.5 Given: $A = \begin{bmatrix} 4 & 2 \\ 0 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 4 \\ -2 & 8 \end{bmatrix}$

Determine:

3.5.1 A^{-1}

3.5.2 B^{-1}

3.5.3 $B^{-1} A^{-1}$ [9]

3.6 Jagger bought a car for N\$2800 in 1980. A similar car now costs N\$348 000 today. What is the inflation rate of cars over this period? [3]

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

