



NAMIBIA
UNIVERSITY
OF SCIENCE AND
TECHNOLOGY

HP-GSB
HAROLD PUPKEWITZ
Graduate School of Business

FACULTY OF COMMERCE; HUMAN SCIENCES AND EDUCATION

HAROLD PUPKEWITZ GRADUATE SCHOOL OF BUSINESS

QUALIFICATION: DIPLOMA IN BUSINESS PROCESS MANAGEMENT	
QUALIFICATION CODE: 06DBPM	LEVEL: 6
COURSE CODE: ITM511C	COURSE NAME: INTRODUCTION TO MATHEMATICS
SESSION: NOVEMBER 2023	PAPER: PAPER 1
DURATION: 3 HOURS	MARKS: 100

SECOND OPPORTUNITY EXAMINATION – QUESTION PAPER

EXAMINER(S)	Ms. A. Sakaria
MODERATOR:	Mr. I. Ndadi

INSTRUCTIONS

1. Answer ALL the questions on the separate answer sheet..
2. Write clearly and neatly.
3. Do not use the left side margin of the exam paper. This must be allowed for the examiner.
4. **QUESTION 1** 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.
5. **QUESTION 2** indicate whether the given mathematical statements are true (T) or false (F).
6. **QUESTION 3** show clearly all the steps used in the calculations.
7. Number the answers clearly.

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 Expand and simplify the expression $(x-3)^2 - x^2 + 6x$ [3]

- A. $12x+9$ B. $-12x+9$ C. $12x-9$ D. 9

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

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

1.3 Simplify $x^2 \times \sqrt{y} \times \sqrt[2]{x^4} \times y^{\frac{1}{2}}$. [3]

- A. $y\sqrt{x}$ B. $xy^{\frac{1}{2}}$ C. $xy^{\frac{1}{4}}$ D. x^4y

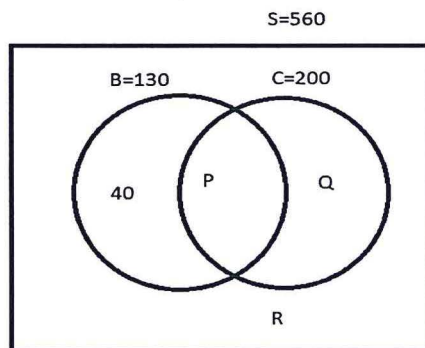
1.4 Find the determinant of the matrix, $\begin{pmatrix} -2 & 3 \\ -1 & 2 \end{pmatrix}$. [3]

- A. -6 B. 1 C. 7 D. -1

1.5 What is the Lowest Common Multiple (LCM) of 30 and 42? [3]

- A. 6 B. 210 C. 420 D. 1260

1.6 The values of P, Q and R in the Venn diagram below are: [3]



- A. $P = 160, Q = 200$ and $R = 200$ B. $P = 130, Q = 200$ and $R = 320$
- C. $P = 90, Q = 110$ and $R = 200$ D. $P = 90, Q = 110$ and $R = 320$

1.7 The prime decomposition of 1287 is: [3]

- A. $33 \times 3 \times 13$ B. 99×13 C. $3^2 \times 11 \times 13$ D. $9 \times 11 \times 13$

1.8 Factorize the expression $-2x^3 - 4x^4 + \frac{1}{2}x^2$. [3]

- A. $\frac{1}{2}x(-2-x+1)$ B. $\frac{1}{2}x^2(-4x-8x^2+1)$ C. $2x^2\left(\frac{1}{2}x-4x^2+\frac{1}{2}\right)$ D. $\frac{1}{4}x^2(-8x-x^2-1)$

1.9 The equation, $x^2 - x - 12 = 0$ has the solutions: [3]

- A. $x = 4, x = -3$ B. $x = -4, x = -3$ C. $x = -2, x = -6$ D. $x = 6, x = -2$

1.10 Determine the sum of the series $\sum_{n=1}^3 2i$. [3]

- A. 48 B. 24 C. 6 D. 12

QUESTION 2 [10 MARKS]

Indicate whether the given mathematical statements are true (T) or false (F)

2.1 The expression $\ln e\sqrt{x^3}$ simplifies to $x^{\frac{3}{2}}$. [2]

2.2 The expression $16p^4 - 81q^8$ can be factorised fully as $4p^2 - 9q^4$. [2]

2.3 $(\log a)(\log b)$ is equal to $\log(a+b)$. [2]

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

2.5 If A is a 2×3 matrix and B is a 3×2 matrix, then we can calculate AB . [2]

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

3.1 Use Cramer's rule to solve for x and y the following:

$$x = \frac{5+3y}{2} \text{ and } 7y = 4x - 11 \quad [7]$$

3.2 Solve the inequality $-4x > -x - 2 < 2x + 1$ and represent your solution on a number line. [6]

3.3 Simplify the expression $\frac{2yx - 4y}{x^2 - 3x - 4}$. [5]

3.4 Mr. Goagoseb has 48 goats and Mrs Namises has 60 goats. They decide to share 1296 kg of animal feed between them, in the ratio of the numbers of their animals. How many kilograms of animal feed does Mrs. Namises get? [3]

3.5 Matrices P , Q and R are defined by

$$P = \begin{pmatrix} x & 2 \\ -5 & -1 \end{pmatrix}, Q = \begin{pmatrix} 2 & -3 \\ 4 & y \end{pmatrix}, R = \begin{pmatrix} -2 & 10 \\ 0 & 6 \end{pmatrix}, \text{ where } x \text{ and } y \text{ are real numbers.}$$

3.5.1 Given that the determinant of matrix P is 2, calculate the value of x . [3]

3.5.2 R^{-1} [4]

3.5.3 The value of y if matrix $RQ = \begin{pmatrix} 36 & -4 \\ 24 & -6 \end{pmatrix}$. [4]

3.6 Leon left N\$800000.00 in his estate account. This amount is to be invested in the estate for 6 years at the interest rate of 12.75% p.a. compounded monthly. After 6 years the maturity value will be distributed amongst his 4 daughters in the ratio of their age. Maria will be 15 years old, Jolene will be 22 years old, Rose will be 28 years old and Tina will be 8 years old.

3.6.1 Calculate the maturity value after 6 years. [4]

3.6.2 What is the difference between Rose and Tina's amount? [2]

3.7 Given the progression; 1; -4; 16; -64; ...

3.7.1 Find the common ratio. [2]

3.7.2 Work out the 9th term of the progression. [5]

3.8 Given $S = \{a, b, c, d, e, f\}$, $A = \{a, c, d, e\}$, $B = \{a, b, e\}$ find:

3.8.1 $B^c \cup A^c$ [4]

3.8.2 $A \cup B$ [3]

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

3.9.1 Present this information in a Venn diagram. [4]

3.9.2 How many students can spell both words? [2]

3.9.3 How many students can spell Parallel or Pythagoras? [2]

END OF EXAMINATION QUESTION PAPER