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 1A
SESSION: NOVEMBER 2024	**PAPER:** SESSION 2
DURATION: 3 HOURS	**MARKS:** 100

SECOND OPPORTUNITY EXAMINATION – QUESTION PAPER

EXAMINER(S)	**Ms. H.Y. NKALLE**
MODERATOR:	**Ms. A.N. SAKARIA**

INSTRUCTIONS

1. Answer ALL the questions.
2. Write clearly and neatly.
3. Number the answers clearly.

PERMISSIBLE MATERIALS

1. Examination paper
2. Examination script
3. Non-Programmable Calculator

THIS QUESTION PAPER CONSISTS OF 4 PAGES (INCLUDING THIS FRONT PAGE)

SECTION A

Question 1 [45 Marks, each question 3 Marks]

1.1 The highest Common Factor of 255, 105 and 90 is:

A. 45 B. 3 C. 5 D.15

1.2 The factors of the expression $-ai + 2x^2 - aix + 2x$ are:

A. $(2x - ai)(x + 1)$ B. $(x - 1)(2x + ai)$ C. $ai(2x^2 - 2x - 1)$ D. $(x - 1)(2x - ai)$

1.3 Three friends, Alex, Brenda and Charles decided to buy a house. Alex pays $\frac{1}{3}$ of the cost, Brenda pays $\frac{2}{5}$ of the cost and Charles pays the rest.

1.3.1 What fraction of the cost does Charles pay?

A. $\frac{5}{12}$ B. $\frac{7}{12}$ C. $\frac{4}{15}$ D. $\frac{1}{3}$

1.3.2 Charles pays N$ 8380 less than Brenda. Calculate the cost of the house.

A. N$ 20950 B. N$ 628500 C. N$ 46090 D. N$ 62850

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 pace.

1.4.1 Determine the length of the trench 1 worker could dig in 1 day.

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

1.4.2 A group of workers digs 12 meters in 1 day. How may workers are in this group?

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

1.5 The expression $\frac{6x^{-4}2x^3}{8x^{-3}}$ Simplifies to:

A. $\frac{3}{2x^4}$ B. $\frac{12x^{-12}}{8x^{-3}}$ C. $\frac{3}{2x^2}$ D. $\frac{3x^2}{2}$

1.6 The average of two number is 7, and three times the difference between them is 18. What are the numbers.

A. 52 and 24 B. 7 and 7 C. 10 and 4 D. 8 and 6

1.7 Express $\frac{1}{a^{-1} \times \sqrt[4]{a^{-8}}}$ in the form a^x.

A. a^{-3} B. a^x C. a^3 D. $a^{\sqrt[4]{8}}$.

1.8 Expand and simplify the expression $(x - xy)^2 - x^2 - x(-2xy)$.

A. $-4x^2y^2$ B. x^2y^2 C. $x - xy$ D. $-x^2y^2$

1.9 If x and $x^2 + x$ are the first two terms of the Geometric Progression (GP), determine the common ratio of the progression.

A. $x + 1$ B. -3 C. $x - 1$ D. $x^2 + 1$

1.10 Given that of 380 students, 210 play soccer and golf, 260 play soccer and 60 play none of the two sports. How many students play golf?

A. 270 B. 60 C. 120 D. 210

1.11 The solution of the quadratic equation $4x^2 - 1 = 0$ are:

A. $(2x + 1)(2x - 1)$ B. $x = 0$ or $x = 1$ C. $x = 4$ or $x = 1$ D. $x = 1/2$ or $x = -1/2$

1.12 Find x if the determinant of $\begin{bmatrix} x & 3 \\ 1 & 2 \end{bmatrix}$ is equal to 5.

A. $x = 1$ B. $x = 5$ C. $x = 4$ D. $x = 12$

1.13 Simplify $(\log_{12} 18 - \log_{12} 3) + \log_{12} 2$

A. 1.079 B. $\log_{12} 6$ C. 1 D. $\log_{12} 9$

SECTION B
QUESTION 2 [32 Marks]

2.1 Out of 600 students (S) taking the course, Introduction to Mathematics 1A (ITM511C), it was found that there are 220 male students (M). It was further found that 20x students qualified to write the June examination(E) of which 5x students are male. Only 5 female students do not qualify to write the June Examination.

2.1.1 Show the information as given above on a Venn diagram. [5]

2.1.2 Find the value of x. [3]

2.1.3 Find the number of female students who qualified to write the June examination. [3]

2.2 Solve the following equations **without using a calculator**:

2.2.1 $\frac{4^x}{8^x} = 32$ [5]

2.2.2 $\log_2 x^2 = 4$ [3]

2.3 Factorise the following expressions **completely:**

2.3.1 $5x^2 - 5$ [3]

2.3.2 $xa - 2xb + ya - 2yb$ [4]

2.4 Simplify the expression below:

$$\frac{x+2}{2x-3} \div \frac{x^2-4}{2x^2-3x}$$ [6]

QUESTION 3 [23 Marks]

3.1 Given the two matrices $A = \begin{bmatrix} 2 & 1 \\ 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ -1 & 4 \end{bmatrix}$, Find $(A + B)^2$. [6]

3.2 Find the values of the letters in the matrix equation below:

$$\begin{bmatrix} 4 & 0 \\ 1 & m \end{bmatrix}\begin{bmatrix} n & p \\ -2 & 0 \end{bmatrix} = \begin{bmatrix} 20 & 12 \\ -1 & q \end{bmatrix}$$ [4]

3.3 The common difference in an Arithmetic Progression (AP) is 3. The 24th term is 74. What is the first term? [3]

3.4 If $x + 2$; $3x + 1$ and $4x - 3$ are the first three terms of an Arithmetic Progression, Find the value of x. [5]

3.5 Evaluate $\log_5(\frac{1}{\sqrt[3]{5}}) + \log_{11} \sqrt[3]{11}$. Show all your workings. [5]

END OF QUESTION PAPER