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QUALIFICATION: **Bachelor of Agriculture, Bachelor of Business Management, Bachelor of Horticulture, Bachelor of Marketing, Bachelor of Natural Resources Management, Bachelor of Entrepreneurship, Bachelor Regional and Rural Development, Bachelor of Public Management, Bachelor of Procurement and Supply Chain Management, Bachelor of Transport Management, Bachelor of Human Resources Management**	
QUALIFICATION CODE: **07BAGA, 07BBMN, 07BHOR,07BMAK, 07BNRS,07BOEN, 07BORR, O7BPMA, 07BPSM, 07BRAR, 07BTRA, 07HRM**	LEVEL: **5**
COURSE: **INTRODUCTION TO MATHEMATICS (BUSINESS AND MANAGEMENT)**	COURSE CODE: **ITM111S**
DATE: **JANUARY 2025**	SESSION: **1**
DURATION: **3 HOURS**	MARKS: **100**

SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION: QUESTION PAPER

EXAMINER: Ms K. DAVID, Ms Y. NKALLE, Ms H. WILHELM, Ms P. NGHISHIDIVALI

MODERATOR: Ms A. SAKARIA

INSTRUCTIONS:

1. Answer **ALL** questions on the separate answer sheet.
2. Please write neatly and legibly.
3. Do not use the left side margin of the exam paper. This must be allowed for the examiner.
4. No books, notes and other additional aids are allowed.
5. Mark all answers clearly with their respective question numbers.

PERMISSIBLE MATERIALS:

1. Non-Programmable Calculator

This paper consists of 4 pages including this front page.

SECTION A: MULTIPLE CHOICE AND TRUE / FALSE [30 MARKS]

QUESTION 1: MULTIPLE CHOICE [20 MARKS]

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

1.1. Which of the following numbers is NOT a composite number? [2]

A. 6 B. 7 C. 8 D. 9

1.2. The product of two consecutive even numbers is 12 more than the square of the smaller number. Find the smaller number. [2]

A. 8 B. 6 C.12 D. 4

1.3. A proper fraction is recognized by: [2]

A. A numerically smaller numerator and larger denominator
B. A numerically lager numerator and smaller denominator
C. A numerator equals to the denominator
D. All of the above

1.4. Find the Highest Common Factor (HCF) of the numbers 255, 105 and 90. [2]

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

1.5. Simplify the expression $-\frac{4}{y^2}-\frac{4}{y}-\frac{1}{y^2}+\frac{3}{y}$ [2]

A. $-\frac{5}{y^2}-\frac{1}{y}$ B. $\frac{-5-7}{y^2}$ C. $\frac{y}{y^2}$ D. $\frac{-12}{y^2-y}$

1.6. Which of the following is a linear equation [2]

A. $3x^2+4$ B. $2x-\frac{5}{2}=3$ C. $\frac{1}{x}+7=4x$ D. $x(x+2)$

1.7. Which of the following surds is in its simplest form? [2]

A. $2\sqrt{17}$ B. $\sqrt{16}$ C. $\sqrt{98}$ D. $3\sqrt{12}$

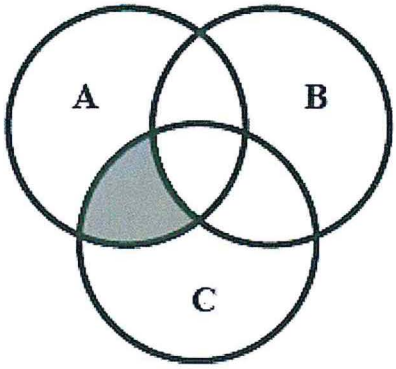
1.8. A group of workers is digging a trench. When there are 6 workers, the length of the trench they can dig is 18 meters in 1 day. All the workers dig at the same rate. Work out the length of the trench 1 worker could dig in 1 day. [2]

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

1.9. Determine the value of x that makes the ratio $x: 9$ the same as the ratio $15: 45$. [2]

A. $x = 3$ B. $x = 5$ C. $x = 6$ D. $x = 9$

1.10. The shaded region on the venn diagram below represents: [2]



A. $A \cup C$ B. $(A \cap C) - B$ C. $(A \cup C)^c$ D. $(A \cap C)^c$

QUESTION 2: TRUE/FALSE **[10 MARKS]**

Evaluate the statements and select whether the statement is **True (T)** or **False (F).** Write the correct answer next to the corresponding number on your ANSWER SHEET.

2.1. Any negative number raised to a power of a positive even number is negative. [2]

2.2. $\log_a(x + y) = \log_a x + \log_a y$ [2]

2.3. The expression $(x + y)^2$ is equivalent to $x^2 + y^2$ [2]

2.4. Given two sets A and B, $A \oplus B = (A - B) \cup (B - A)$ [2]

2.5. If A and B are matrices of which $B = A^{-1}$, then $AB = BA$ [2]

SECTION B: STRUCTURED QUESTIONS

QUESTION 3: **[70 MARKS]**

3.1. Evaluate the following expressions without using a calculator:

3.1.1. $\frac{2}{5}\ of\ \frac{5}{6} \div \frac{3}{8} \times 2\frac{1}{3}$ [5]

3.1.2. $4\sqrt{2} + 5\sqrt{98} + 3\sqrt{50}$ [5]

3.1.3. $log_5 25 - log_{25} 5 + log_{10} 1$ [5]

3.2. Round the following numbers to the nearest value indicated in brackets:

3.2.1. 0.3757 (to 3 decimal places) [1]

3.2.2. 4195.0124 (to 2 significant figures) [1]

3.3. Solve the following simultaneous equations using the **elimination method**. [4]

$$3x - 2y = 14$$

$$5x - 2y = 6$$

3.4. Factorize the following expressions:

3.4.1. $3xy + 6x + 2y + 4$ [4]

3.4.2. $25a^4 - 49b^2$ [3]

3.5. A survey was conducted among 250 people (S) regarding their preferences for three sports: football (F), basketball (B), and tennis (T). The results showed: 120 people like football. 90 people like basketball. 100 people like tennis. 40 people like both football and basketball. 30 people like both basketball and tennis. 50 people like both football and tennis. 20 people like all three sports.

3.5.1. Draw a Venn diagram to represent the information given above. [6]

3.5.2. Find how many people like only football, basketball only and tennis only. [3]

3.5.3. Find how many people do not like any of these sports. [2]

3.6. Use Cramer's rule to find the values of x and y in the following system of linear equations: [5]

$3x + 2y = 7$ and $5x - 4y = -3$

3.7. Determine the value of $x, y,$ *and* z in the following matrix equation: [5]

$$\begin{bmatrix} x & 3 \\ y & 2 \end{bmatrix} + \begin{bmatrix} z & 1 \\ x & y+z \end{bmatrix} = \begin{bmatrix} 6 & 4 \\ 5 & 7 \end{bmatrix}$$

3.8. Let $A = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$, and $B = \begin{bmatrix} 0 & -2 \\ 1 & 3 \end{bmatrix}$,

3.8.1. A^{-1} [4]

3.8.2. AB [4]

3.9. An arithmetic progression is given by $4m, (4m + 6), (4m + 12), \ldots$. If the 8^{th} term is 58, find the value of m. [5]

3.10. Bank Windhoek offers 10% interest on a savings account. If Tom deposits $N\$20\ 000$ in the account, calculate the interest and the total amount in the account after 3 years if interests are compounded semi-annually. [4]

3.11. Determine the sum of the following series:

3.11.1. $\sum_{k=5}^{7} 2k$ [2]

3.11.2. $\sum_{m=1}^{2} \frac{(-1)^m}{m}$ [2]

END OF QUESTION PAPER