NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

QUALIFICATION: Bachelor of Technology: Geo-Information Technology, Bachelor of Human Resources Management, Bachelor of Marketing, Bachelor of Transport Management, Bachelor of Business Administration, Bachelor of Agricultural Management, Bachelor of Horticulture	
QUALIFICATION CODE: 07BGIT,07BHRM,07BMAR,07BBAD,27BAGR,07BTRM	**NQF LEVEL:** 5
COURSE NAME: INTRODUCTION TO MATHEMATICS (BUSINESS AND MANAGEMENT)	**COURSE CODE:** ITM111S
SESSION: MAY 2019	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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MODERATOR:	Mr G. TAPEDZESA

INSTRUCTIONS

1. Answer ALL the questions in the booklet provided.
2. Show clearly all the steps used in the calculations.
3. All written work must be done in blue or black ink and sketches must be done in pencil.
4. You may not start to read the questions printed on the subsequent pages of this question paper until instructed that you may do so by the invigilator

PERMISSIBLE MATERIALS

1. Non-programmable calculator without a cover.

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

SECTION A [35 Marks]

QUESTION 1

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

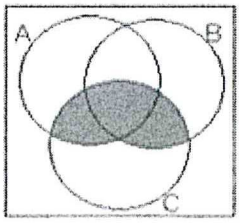
1.1. Determine the value of n that makes the ratio 3:15 the same as the ratio n: 90? [2]

A. $n = 450$ B. $n = 30$ C. $n = 18$ D. $n = 6$

1.2. Given the progression: 4; 12; 36; 108;... find the seventh term of the progression? [2]

A. 972 B. $456\frac{1}{3}$ C. 117 D. 2916

1.3 From the Venn diagram below, describe the shaded area ? [2]



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

1.4 The expression $(a + b)^2 + 2ab - a^2$ *simplify to*? [2]

A. $a^2 + 4ab$ B. $5a^2 + b^2$ C. $4ab + b^2$ D. 1

1.5 Which of the following is not a natural number? [2]

A. 2 B. 77 C. 77777 D. 0

1.6 Determine the HCF of 126;216; 243? [2]

A. 9 B. 27 C. 6 D. 3

1.7. Given matrices $\begin{pmatrix} 2 & e \\ ak & 3 \end{pmatrix} + k\begin{pmatrix} 3 & 1 \\ 0 & -2 \end{pmatrix} = \begin{pmatrix} 8 & 6a \\ -6 & -1 \end{pmatrix}$, find the value of a, e *and* k [3]

A. $k = 2, e = 20, a = -3$ B. $k = -2, e = 4, a = 3$

C. $k = -2, e = -20, a = -3$ D. $k = 2, e = -20, a = -3$

1.8. Factorise the expression $2ab^2 - abd - 2bc + cd$. [3]

A. $(ab - c)(ab - c)$ B. $(ab - c)(2b - d)$

C. $(ab - c)(2b + d)$ *D.* $(2b - d)(ab + c)$

1.9. Simplify the expression $\frac{7^{x+1} \times 7^{x+2}}{7^{x-1} \times 7^{x-2}}$. [3]

A. 7^6 B. 7^0 C. 7^{-2} D. 7^{4x+6}

1.10. The solution of the inequality $\frac{1}{3(x-3)} > \frac{1}{2(x+2)}$ is? [3]

A. $x < 13$ B. $x < -12$ C. $x < -14$ D. $x < -15$

1.11. The solution set of $6x^2 - x - 15 = 0$ is? [3]

A. $\frac{5}{3}$ *and* $\frac{-3}{2}$ B. -9 *and* -10 C. -9 *and* 10 D. -9 *and* -10

1.12 Which of the following is a singleton? [2]

A. $\{1; 0\}$ B. $\{0\}$ C. (0) D. $\{\emptyset\}$

1.13 In a Mathematics class, the number of boys is 5 more than twice the number of girls. Which of the following expressions represents the number of boys in the class if the Number of girls is n? [3]

A. $2 \times 5n$ B. $2n + 5$ C. $n + (5n + 3)$ D. $n > (5n + 2)$

1.14 Given $S = \{1,3,4,5,6\}, A = \{1,3,4,5\}, B = \{1,2,5\}, find\ P(A^c)$? [3]

A. $\{\{6\}, \{0\}\}$ B. $\{(6), \{0\}\}$ C. $\{\{6\}, \emptyset\}$ D. $\{\{0\}\{\emptyset\}$

SECTION B [65 Marks]

QUESTION 2 (Clearly show all your work)

2.1 Given that $A = \begin{pmatrix} -2 & 3 \\ -2 & 0 \end{pmatrix}, B = \begin{pmatrix} -2 \\ 4 \end{pmatrix}, C = \begin{pmatrix} 4 & -3 \\ 1 & 0 \end{pmatrix}, calculate:$

2.1.1 $-3A^2$ [5]

2.1.2 AB [5]

2.1.3 $(AC)^{-1}$ [7]

2.2 Consider the following sets $A = \{1,2,3,4,5,7,8,9,10\}$, $B = \{2,4,6,8\}$,

$C = \{4x: 0 < x < 4, x \text{ is an integer}\}$. List the elements of each of the following subsets:

2.2.1 $B \cup C$ [2]

2.2.2 $B \oplus C$ [3]

2.2.3 $A \cap (B \cup C)$ [2]

2.2.4 $n(C)$ [2]

2.3 Solve the following linear equations:

2.3.1 $(x + 3)(x - 1) = x^2 + 5$ [3]

2.3.2 $\frac{x}{3} = 2 + \frac{x}{4}$ [3]

2.4 Solve the following simultaneous equation using Cramer's rule

$2x - y = 3$ [4]

$3x + 2y = 8$

2.5 Write the terms and determine the value of the the sum [5]

$$\sum_{i=3}^{6}(i+1)^2$$

2.6 After a price increase of 25%, the price of a car is N$220 000. What was the price before the increase? [4]

QUESTION 3 (20 MARKS)

3.1 If the 3rd term of a progression is 18 and the fourth is 25, find

3.1.1 The common difference [2]

3.1.2 The first term [2]

3.1.3 The 20th term [3]

3.2 Jenny inherited a sum of money from her father, she wants to invest part of the inherited money so that after 10 years she could get N$250 000 from the investment. The bank has accepted to pay interest at 7.5 % per annum compunded semi-annually.

i) How much should Jenny invest? [5]

ii) How much interest would her investment generate? [2]

3.3 Evaluate the following without the use of a calculator:

3.3.1 $\log_3 243 + \log_2 16 - \log_5 125$ [4]

3.3.2 $\frac{\sqrt{12}\times\sqrt{3}}{\sqrt{4}}$ [2]

END