



PAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY
FACULTY OF HEALTH AND APPLIED SCIENCES
DEPARTMENT OF MATHEMATICS AND STATISTICS

QUALIFICATION: Bachelor of science ; Bachelor of science in Applied Mathematics and Statistics	
QUALIFICATION CODE: 07BOSC; 07BAMS	LEVEL: 5
COURSE CODE: SAT501S	COURSE NAME: SETS, ALGEBRA AND TRIGONOMETRY
SESSION: JULY 2019	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SECOND OPPORTUNITY/ SUPPLEMENTARY EXAMINATION QUESTION PAPER	
EXAMINER	MRS. L. KHOA MR. G. TAPEDZESA
MODERATOR:	DR. S.N. NEOSSI NGUETCHUE

INSTRUCTIONS
<ol style="list-style-type: none">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.

PERMISSIBLE MATERIALS

1. Non-programmable calculator without a cover.

THIS QUESTION PAPER CONSISTS OF 3 PAGES (Including this front page)

QUESTION 1 [5 Marks]

Given that $A = \{\phi, \{\{\phi\}\}\}$, $B = \{\phi, \{\phi\}, \{\phi, \{\phi\}\}\}$ and $C = \{\phi, \{\phi\}, \{0, \phi, \{\phi\}\}\}$

State whether the following are true or false:

- a) $\phi \in B$ [1]
- b) $\{\phi\} \in A$ [1]
- c) $\{\phi\} \subseteq C$ [1]
- d) $B - C = A$ [1]
- e) $n(B) = n(C)$ [1]

QUESTION 2 [14 Marks]

Simplify without a calculator:

- a) $\frac{2}{-1+i}$ leave your answer in the form $a + bi$ [3]
- b) $\sqrt{-25} \times (-\sqrt{16}) \times \sqrt{-9} \div \sqrt{-36}$ [4]
- c) $(\log_2 8)^2 + \frac{1}{2} \log_{\sqrt{2}} 2$ [2]
- d) $\frac{3^{x-1} \times 9^{2x-3} \times 81^{3-2x}}{9^{2-x}}$ [5]

QUESTION 3 [26 Marks]

Solve for x:

- a) $2\log_{100}(x+1) - \log(2x) = \log(\frac{2}{x})$ [8]
- b) $e^{2x} - 3e^x + 1 = -1$ [6]
- c) $|x+4| = 3x-8$ [5]
- d) $\log_2 x - 6\log_x 2 + 1 = 0$ [7]

QUESTION 4 [29 Marks]

Solve:

- a) $x(2x+5) = (x-1)^2 - 7$ by completing the square. [6]
- b) $\sqrt{x-3} + \sqrt{x+5} = 4$ [6]
- c) $\ln 6 + \ln(x-3) = 2 \ln y$ and $2y - x = 3$ simultaneously [6]
- d) $-8x^2 + 6x + 27 \leq 0$, write your solution in interval notation. [6]
- e) Find the term that does not contain x in the expansion of $(2x - \frac{2}{x})^6$ [5]

Question 5 [17 Marks]

a) Evaluate:

- i) $\sum_{n=1}^{\infty} \frac{1}{2^n}$ [4]

ii) $\sum_{k=1}^{100} (4k + 5)$ [4]

b) if $3a - 1$, $6a$ and 19 are the first three consecutive terms in an arithmetic progression:

i) Find the value of a [4]

ii) Determine the common difference, d [2]

iii) Determine the sum of the first 10 terms. [3]

Question 6 [9 Marks]

Prove the following Trigonometric identities:

a) $1 - \frac{\sin \theta \tan \theta}{1 + \sec \theta} = \cos \theta$ [5]

b) $\frac{\sin 2x}{\sin x} - \frac{\cos 2x}{\cos x} = \sec x$ [4]

TOTAL MARKS: 100

END OF PAPER