POLYTECHNIC OF NAMIBIA
SCHOOL OF HEALTH AND APPLIED SCIENCES
DEPARTMENT OF MATHEMATICS AND STATISTICS

QUALIFICATION: BACHELOR OF SCIENCE IN APPLIED MATHEMATICS AND STATISTICS
BACHELOR OF SCIENCE
QUALIFICATION CODE: 35 BAMS: 07BOSC

COURSE NAME: ALGEBRA AND TRIGONOMETRY
COURSE CODE: ALT111S

DATE: NOVEMBER 2014
DURATION: 3 HOURS
MARKS: 100

SECOND OPPORTUNITY EXAMINATION QUESTION PAPER

EXAMINERS: Ms. S. Heelu; Ms. S. Mwewa; Ms. T. Ndakolonkoshi
MODERATOR: Mr. B. Obabueki

INSTRUCTIONS:
1. Examination conditions apply at all times. NO books, note or cell phones allowed
2. Answer all questions and number your solutions correctly
3. Untidy / illegible work will attract no marks

PERMISSIBLE MATERIAL: Calculator
APPENDIX: none

This question paper consist of 3 pages including this cover page
QUESTION 1 [25 MARKS]

Simplify each of the following expressions

1.1 \((-1 - i)^2\) [5]

1.2 \(\frac{4 - 2i}{1 + i} + \frac{2 - 5i}{1 + i}\) [5]

1.3 \(\sqrt{3}\left(\sqrt{2} - \sqrt{3}\right)^2\) [5]

1.4 \(\frac{4^x + 2 - 4^{x-1}}{4^{x-1}}\) [5]

1.5 \(\log_2 5 \times \log_3 \sqrt{8} \times \log_5 3\) [5]

QUESTION 2 [32 marks]

Solve the following equations

2.1 \(\frac{64 \cdot 2^{x+1}}{16^x - 2} = 256\) [6]

2.2 \(\log_2 x - \log_8 x = 4\) [6]

2.3 \(\sqrt{x - 3} + \sqrt{x + 2} = 5\) [6]

2.4 \(5^{x^2} + 7^{x^2} = 3468\) and \(7^x = 5^x - 76\) [8]

2.5 \(\ln 2 + 2 \ln x = \ln(x + 3)\) [6]

QUESTION 3 [43 marks]

3.1 Solve for \(x\): \(4x - 2 < 10\) and \(3x + 1 > 22\) and graph your solution. [6]

3.2 An operator assisted station to station phone call from town A to town B costs N$2.25 plus N$0.38 for each additional minute after the first three minutes. A group of such calls were made, each costing between N$6.05 and N$8.71, inclusive. Find the range (in minutes) for the lengths of these calls. [7]
3.3 If $3m - 1$, $6m$ and $19$ are three consecutive terms in AP, find the value of $m$. [4]

3.4 Evaluate $\sum_{m}^{n} \frac{1}{3^m}$. [6]

3.5 In a Venn diagram $n(A) = 70 - x$, $n(B) = 75$, $n(A \cap B) = 2x$ and $n(A \cup B) = 115$.

3.5.1 Write in terms of $x$ the number of elements in $A$ but not in $B$. [3]

3.5.2 Write in terms of $x$ the number of elements in $B$ but not in $A$. [2]

3.5.3 Determine in terms of $x$ $(A \cup B)$. [3]

3.5.4 Determine the value of $x$. [4]

3.6 Simplify each of the following trigonometric expressions

3.6.1 $\sin \varphi \sec \varphi \cot \varphi$ [3]

3.6.2 $\cos^2 \beta \sec^3 \beta - \cos^3 \beta$. [5]