

**BONDO UNIVERSITY**

**UNIVERSITY EXAMINATIONS 2012/2013**

**FIRST YEAR FIRSTSEMESTER EXAMINATIONS**

**FOR THE DIPLOMA IN PUBLIC HEALTH**

**SMA 2111:MATHEMATICS 1**

**Date:**

**Time 9:00-12:00 noon**

**INSTRUCTIONS:**

- 1.This examination paper contains two sections,A and B.**
- 2.Answer all questions in section A and any other TWO in section B.**
- 3.Start each question on fresh page.**
- 4.Indicate question numbers clearly at the top of each page.**

**SECTION A (30 MARKS).**

1. Given the sets  $A: \{1,2,3,4,5\}$ ,  $B: \{2,4,6,8,10\}$  and  $C = \{6,7,8,9,10\}$ .

Find:

(a)  $(A \cup B)^c$       1mk

(b)  $A \cup (B \cap C)$       1mk

(c)  $(A \cap B) \cap C$       1mk

2. Draw a Venn diagram for three non-empty sets A, B and C so that  $A \cap B \cap C$  will have the following properties.

(a)  $A \cap B, C \cap B, A \cap C = \emptyset$       1mk

(b)  $A \cap C, A \cap B, B \cap C = \emptyset$       1mk

(c) Prove that:  $(A - B) \cap A = \emptyset$ .      1mk

3. Determine whether the relation  $\{(x,y)/y^2 = x\}$  is a function and specify its domain and range.      3mks

4. Find the inverse of

$f(x) = 3/2x - 1/4$       3mks

5. After a dance a driver asks a group of people if they need a ride. 10 people need a ride but there is only room for four. In how many ways can the group of passengers be given that all seats are filled.

6. Prove that

$1/\cos^2 - \cos^2 - \sin^2 / \cos^2 = \sin^2$       3mks.

7. If  $f(x)=x^2$  and  $g(x)=x-3$ , find  $(g \circ f)(x)$  and determine its domain. 3mks
8. The seventh term of an arithmetic sequence is 80. If the eleventh term is 68, what is the 4<sup>th</sup> term? 3mks
9. Show that  $\log_x A^n = n \log_x A$ . 3mks
10. State three ways in which statistical data is represented. 3mks

**SECTION B (ANSWER ANY TWO QUESTIONS).**

11. The table below shows the heights to the nearest cm, of 100 students. 15mks

Heights (cm)	140-145	146-151	152-157	158-163	164-169	170-175	176-181	182-187	188-193	194-199
Frequency	3	4	7	10	10	15	25	16	8	2

Find

- (a) The mean
- (b) The median
- (c) The modal class
- (d) The variance

12. Find the sum of the first 10 terms in the following G.P.S

- (a)  $3+6+12+24+\dots$  5mks
- (b)  $12+4+4/3+\dots$  5mks

(c) The vertex form of the parabola  $y=a(x-h)^2+k$ . Complete the square to rewrite  $y=x^2-2x+2$  in the vertex form and hence state the vertex coordinates. 5mks.

13(a). Barry bought a number of shares of stock for \$ 600. A week later the value of the stock increased \$3 per share and he sold all but 10 shares and regained his original investments of \$ 600. How many shares did he sell and at what price per share? 10mks

(b) If  $f(x)=x^2+2x-3$ , find

$\frac{f(a+h)-f(a)}{h}$  5mks

h

14.(a) Find the value of  $(1.01)^8$  correct to 4 d.p 4mks

(b) Simplify  $\cos^2 48 \cos^2 42$ . 4mks.

c) A man borrows sh. 6,000,000 at 3% p.a. He is to repay sh. 1,000,000 at the end of each year. How much will he still be owing after the third year's repayment. 7mks.

**END. MERRY CHRISTMAS**

## **COURSE OUTLINE;**

1. Elementary set theory and venn diagrams.
2. Relations and functions; domains, codomains, range, inverse of afunction and compositions of functions.
3. Trigonometry; functions and their graphs, sine and cosine formulae, trigonometry identities and equations.
4. Algebra; quadratic equations, logarithms and indices and surds.
5. Sequences and series; arithmetic and geometric progression, permutation and combination.
6. Binomial theorem and applications such as approximations, simple and compound interest.
7. Statistics; collection and representation of data, introduction to measures of central tendencies and variability. END.