

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 4th 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.