



## **MASENO UNIVERSITY**

**SECOND YEAR FIRST SEMESTER EXAMINATIONS FOR THE  
DEGREE BACHELOR OF SCIENCE IN INFORMATION  
TECHNOLOGY  
(CITY CAMPUS - EVENING)**

### **CIT 103: MATHEMATICS FOR INFORMATION TECHNOLOGY**

Date: 31<sup>st</sup> March, 2014

Time: 5.30 – 7.30 p.m.

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#### **INSTRUCTIONS:**

- **Answer ALL questions in Section A (30 marks).**
- **Answer ANY TWO questions in Section B 20 marks each.**

### INSTRUCTIONS

- 1 Answer ALL questions in Section A. They attract a total of 30 Marks.
- 2 Answer any TWO QUESTIONS in Section B. Each question attracts a total of 20 marks.

### SECTION A

Q1 (a)

Briefly define the term function and show the various ways it can be notated.  
**5 marks**

(b) Briefly discuss the importance of the following in the mathematics.

(i) relation **2marks**

(ii) Undirected tree **2marks**

(b) Discuss what you understand by the term universe of discourse in set theory.  
**5marks**

(c) Syllogism is the basic unit of reasoning. Give three examples of syllogism.  
**6marks**

(d) The predicate calculus makes heavy use of symbolic notation. Explain how the lower -case and upper letters  
**5marks**

(f) Distinguish a set from its members using notations. **5marks**

**SECTION B: ANSWER ANY TWO QUESTION IN THIS SECTION**

**Q2** There are a number of formulas and logical operators in logic which can be deduced from the definition of logic

(a) Give any FIVE symbols, names and meaning of the logical operators in logic. **10marks**

(b) Using examples give the meaning of each of the operators in Q2(a) **10marks**

**Q3** (a) Discuss the importance of Cartesian product in and give examples associated with it. **10marks**

(b) If  $Y = 4 - 10X^4 + 5X^2 - 1X - 6$ , Determine:

(i)  $dy/dx$  and  $d^2y/dx^2$

(ii) The values of X at which  $dy/dx=0$  **10marks**

**Q4** (a) Using examples explain how set union and intersection differ. **10marks**

(b) Determining  $dw/da$  in the following expressions:

(i)  $w = \sin a/a$

(ii)  $w = a^2 \ln a$

**Q5** (a) Suppose we have a predicate M meaning "is a man", another predicate S meaning "Is Single" and another predicate D meaning "Drives".

(i) Generate three atomic formulas each for M, S and D **5marks**

(ii) Generate a typical formula built from the atomic formulas in 5(a)(i) and interpret it accordingly. **5marks**

(b) Determine the value of the integrals in each of the following cases

(i)  $\int \sin a \, da$

(ii)  $\int \sec^2 a \, da$

(iii)  $\int 7 \cdot \cos a \, da$

(iv)  $\int 1/a \, da$

**10marks**