OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, STUDENT AFFAIRS AND RESEARCH

UNIVERSITY EXAMINATIONS
2017 /2018 ACADEMIC YEAR
FIRST YEAR SECOND SEMESTER REGULAR EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

COURSE CODE: COM 123
COURSE TITLE: MATHEMATICS FOR SCIENCE II

DATE: 25TH APRIL, 2018   **TIME: 9AM – 12.00 NOON**

INSTRUCTION TO CANDIDATES
- **SEE INSIDE**

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COM 123: MATHEMATICS FOR SCIENCE II

STREAM: COMPUTER SCIENCE   **DURATION: 3 Hours**

INSTRUCTIONS TO CANDIDATES

i.   *Answer Question **ONE** and any other **TWO** questions.*

ii.   *Maps and diagrams should be used whenever they serve to illustrate the answer.*

iii.   *Do not write on the question paper.*

SECTION A (24 MARKS) COMPULSORY

QUESTION ONE (12 Marks)

(a) Describe the three different types of logic   (6 Marks)

(b) Provide a brief description of a valid reference in mathematical computing   (2 marks)

(c) Describe the technique that may be employed when verifying tautologies   (4 Marks)

QUESTION TWO (12 Marks)

(a) With regards to express logical connectives distinguish between CNF and DNF   (4 Marks)

(b) Explain three conditions that must exist within a formal system for it to be considered to be logical   (6 Marks)

(c) State the condition under which an inference is considered to be possessing purely formal content   (2 Marks)

SECTION B (36 MARKS) ATTEMPT ANY THREE QUESTIONS

QUESTION THREE (12 Marks)

(a) (i) Differentiate between soundness and completeness of propositional logic   (6 Marks)

(ii) Suppose you are in the business of making machines which make widgets, and suppose that someone comes to you and says "I need a machine which makes red widgets which are either round or square". Explain how you would use soundness and completeness to convert the said potential customer into an actual customer.   (6 Marks)
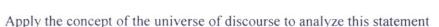
QUESTION FOUR (12 Marks)

(a) Consider the inference "All ravens fly. Peter is a raven. So, Peter flies" In regard to proposition logic, provide a detailed breakdown of the aforementioned inference (6 marks)

(b) Consider the following statement:
1. Jane is Paul's mother.
2. Jane is Mary's mother.
3. Any two persons having the same mother are siblings.
4. Paul and Mary are siblings.

Apply the concept of the universe of discourse to analyze this statement (6 Mark)

QUESTION FIVE (12 Marks)

(a) While considering the semantics of predicate logic, make the assumption that a model M consists of a Domain of Discourse D and an interpretation function I, state the role of an Interpretation, Assignment and Valuation within the assumption (6 marks)

(b) Discuss the concept of s logical connective clearly stating its main motive (6 marks)

QUESTION SIX (12 Marks)

(a) Discuss the four principal tasks of proof theory (8 marks

(b) State two conditions that the semantic of predicate logic is able to achieve in a statement (4 marks)

QUESTION SEVEN (12 MARKS)

(a) Suppose you know of an argument only that it is valid and has a true conclusion. State whatever if anything you can tell about its premises and ensure that you defend your answer (9 Marks)

(b) Define the concept of an atomic position (3 marks)

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