



(Knowledge for Development)

KIBABII UNIVERSITY COLLEGE

**A CONSTITUENT COLLEGE OF
MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY**

UNIVERSITY EXAMINATIONS

2014/2015 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER

MAIN EXAMINATION

FOR THE DEGREE OF BSC COMPUTER SCIENCE

COURSE CODE: CSC 225

COURSE TITLE: LOGIC PROGRAMMING

DATE: 29TH APRIL, 2015

TIME: 8.00AM-10.00PM

INSTRUCTIONS TO CANDIDATES

Answer Question One in Section A and Any other **TWO** (2) Questions in Section B

TIME: 2 Hours

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- Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no Answer Questions ONE and ANY OTHER TWO.
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This paper consists of 4 printed pages. Please turn over.

SECTION A
ANSWER ALL QUESTIONS FROM THIS SECTION (30 MARKS)

Question One

- a) What is knowledge base in prolog?
(2 Mark)
- b) Explain the meaning of the following prolog rule:
jealous(X,Y):- loves(X,Z), loves(Y,Z).
(3 Marks)
- c) Briefly outline two other programming languages, apart from prolog, that you could expect logic as programming languages.
(2 Marks)
- d) Why Study Logic within IT?
(5 Marks)
- e) Explain, why Logic programming languages are considered nonprocedural?
(4 Marks)
- f) What is prolog used for?
(3 Marks)
- g) What are the THREE clauses of prolog?
(3 Marks)
- h) Consider the statement, “Mia, Jody, and Yolanda are women, that Jody plays air guitar, and that a party is taking place”. Write this in prolog
(5 Marks)
- i) Outline, how the constructs: strings, variables, and constants are used in prolog.
(3 Marks)

SECTION B
ANSWER ANY TWO QUESTIONS FROM THIS SECTION (40 MARKS)

Question Two

Consider the following program that contains a number of predicates that describe a family's genealogical relationships.

```
female(amy).  
female(johnette).  
  
male(anthony).  
male(bruce).  
male(ogden).  
  
parentof(amy,johnette).  
parentof(amy,anthony).  
parentof(amy,bruce).  
parentof(ogden,johnette).  
parentof(ogden,anthony).  
parentof(ogden,bruce).
```

- a) Name the predicates that the above program contains?
(3 Marks)
- b) Assume that you wanted to know if johnette had any siblings. What does it mean to be a sibling?
(2 Mark)
- c) Consider, "X is the sibling of Y provided that Z is a parent of X, and Z is a parent of Y." Translate this statement into prolog rule.
(4 Marks)
- d) The above prolog rule however, also defines a child to be its own sibling which is incorrect. To correct this you must add that x and y are not the same. What is the corrected version of the prolog rule?
(5 Marks)
- e) Replace the siblingof with the relation brotherof but this requires an additional condition that X must be a male. What will be the newer version of the prolog rule?
(6 Marks)

Question Three

A Prolog program consists of a database of facts and rules, and queries (questions), variables and constants. Discuss each of this clause.

(20 Marks)

Question Four

- a) Logic is a formal system in which the formulas or sentences have true or false values. Write short notes on
- i) Syntax
 - ii) Semantics
 - iii) Inference Procedure

(9 Marks)

- b) Propositional Logic (PL) is a simple language that is useful for showing key ideas and definitions.

- i) Describe what propositional symbol is

(3 Marks)

- ii) What is a sentence and explain different types of sentences used in PL

(8 Marks)

Question Five

Consider the knowledge base:

happy(vincent).

playsAirGuitar(vincent):- listens2Music(vincent), happy(vincent).

playsAirGuitar(butch):- happy(butch); listens2Music(butch).

- a) List the predicates that the above knowledge base consists of?

(3 Marks)

- b) What exactly does the first rule in above knowledge base mean?

(5 Marks)

- c) Thus, if we posed the following query, how would prolog respond? Explain the answer.

?- playsAirGuitar(vincent).

(3 Marks)

- d) Explain the meaning of each of the following symbols in regard to the above knowledge base:

i) :-

ii) ,

iii) ;

(6 Marks)

- e) Thus, if we posed the following query, what is the meaning of such query in prolog.

?- happy(X).

(3 Marks)