KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2010/2011

INSTITUTE OF OPEN LEARNING

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

SIT 108: INTRODUCTION TO LOGIC

DATE: THURSDAY, 3RD FEBRUARY 2011 **TIME: 2.00 P.M. - 4.00 P.M.**

INSTRUCTIONS

Answer any three questions

QUESTION ONE

(a) Define the following terms as used in logic
   (i) Argument
   (ii) Premises
   (iii) Validity
   (iv) Soundness
   (v) Proposition (5 marks)

(b) Differentiate between the following terms as used in logic
   (i) Form and content
   (ii) Formula and a term (5 marks)

(c) For each of the following English arguments, first translate the argument into the language of sentential logic, and then construct a truth table to determine whether the argument is valid or invalid. You must draw a complete truth table for each.

(i) The DEATH penalty should be adopted only if it PREVENTS murder. However, the death penalty does not prevent murder unless murderers UNDERSTAND the consequences of their actions before acting.Murderers do not understand the consequences of their actions before acting. Therefore, the death penalty should not be adopted. (5 marks)

(ii) Unless social security will be PRIVATIZED, the nation's social security resources will not GROW at the rate of inflation. Thus, either there will be a BUDGET deficit or social security will be privatized, because if there will be a budget deficit, then the nation's social security resources will not grow at the rate of inflation.(5 marks)

QUESTION TWO

For each of the following arguments, construct a formal derivation of the conclusion from the premises.

(a) $(P \rightarrow \sim Q) \& (Q \vee R)$
$T \rightarrow (R \rightarrow H)$
$T \& \sim H$
SHOW $S \vee \sim P$ (5 marks)

(b) $(S \vee P) \leftrightarrow (\sim T \rightarrow \sim R)$
SHOW $(R \& S) \rightarrow T$ (5 marks)

(c) (A v B) v C
A → C
(~C v A) → ~ (B v C)
SHOW C (5 marks)

(d) D v ~C
~D → (B → C)
SHOW [A → (B v C)] → (A →D) (5 marks)

QUESTION THREE

Translate the following statements into the language of predicate logic. Use the Vrst letters of the capitalized words in your translations (either as lower or uppercase).

(a) NEPTUNE and JUPITER are un-INHABITABLE.
(b) Neither NEPTUNE nor MERCURY are GASEOUS.
(c) NEPTUNE and URANUS are NEIGHBORS.
(d) CALLISTO ORBITS JUPITER, unless it ORBITS NEPTUNE.
(e) No STARS are INHABITABLE.
(f) Some PLANETS are not INHABITABLE.
(g) All GASEOUS PLANETS ROTATE.
(h) Not everything is INHABITABLE.
(i) Something both ROTATES and is GASEOUS.
(j) Every GASEOUS PLANET either ROTATES or DRIFTS. (2 marks each)

QUESTION FOUR

For each of the following arguments, construct a formal derivation of the conclusion from the premises.

(a) $\forall x(Gx \leftrightarrow Hx)$
$\exists xHx$
$\sim Ha$
Show $\exists xGx\&\sim\forall xGx$ (10 marks)

(b) $\forall x[(Fx \vee Gx) \rightarrow (Hx\&Ix)]$
$\sim\forall xHx$
Show $\exists x\sim Fx$ (10 marks)

QUESTION FIVE

EVALUATE the following arguments: is it a "good" argument or not? You must justify your claim. You may do so by discussing the acceptability and / or relevance of the premises, or the cogency of the argument. Is the argument valid? Is it sound? Or does it commit some fallacy? You may want to standardize the argument, or even build a truth table. You have to decide what is required to for a full and intelligent justification of your answer.

You have developers in town telling the mayor he shouldn't slash prices on the Olympic village condos because it would have a ripple effect throughout the city. The ripple effect would be that it wouldn't just cost city taxpayers tens of millions of dollars, but innocent third parties, too. All of these effected people would likely vote against the mayor in the next election.