UNIVERSITY COLLEGE LONDON

University of London

EXAMINATION FOR INTERNAL STUDENTS

For The Following Qualifications:-

B.Sc. *B.Sc.(Econ)*

Philosophy B1: Logic

COURSE CODE	:	**PHILB001**
UNIT VALUE	:	**1.00**
DATE	:	**07-MAY-04**
TIME	:	**10.00**
TIME ALLOWED	:	**3 Hours**

04-C1032-3-30

TURN OVER

B1 LOGIC

Answer all questions

All questions have equal value

PART A. BASIC LOGICAL NOTIONS

1. Define the validity of an argument. Give an example of a valid argument with at least one false premise. Is this argument sound?
2. If you know that the conclusion of an argument is logically true, what, if anything, can you conclude from this about the validity of the argument? Explain your answer.
3. If the premises and conclusion of an argument form a logically consistent set, what, if anything, can you conclude from this about the validity of the argument? Explain your answer.

PART B. SYMBOLISATION IN SL

Translate the following sentences into SL using the symbolisation key provided:

A: Anna committed the murder.	G: The killer used a gun.
B: Bilal committed the murder.	P: The killer used poison.
C: Cory committed the murder.	H: Holmes will find the murderer.

4. The killer didn't use a gun if neither Anna nor Cory committed the murder.
5. Bilal committed the murder only if Cory didn't.
6. Holmes won't find the murderer unless Bilal committed the murder using poison.
7. No more than two people (out of Anna, Bilal and Cory) committed the murder.

PART C. SYNTAX AND SEMANTICS OF SL

8. What is the definition of a truth-functional connective? Give an example from English of a connective that is *not* truth-functional and explain why this is so.
9. Use the truth table method to determine whether the following sentences are truth-functionally equivalent:

$$\sim(\sim P \supset Q) \vee (\sim Q \;\&\; \sim P) \qquad\qquad \sim(P \equiv \sim Q)$$

10. Use the short corresponding conditional truth table method to determine whether the argument

$$\begin{array}{l} P \supset (\sim S \;\&\; R) \\ \underline{\sim S \supset Q \qquad\qquad} \\ \sim(P \;\&\; \sim Q) \vee (R \supset S) \end{array}$$

is truth-functionally valid. Explain your answer.

PART D. DERIVATIONS IN SENTENTIAL LOGIC

Show by deduction that the following derivability claims hold:

11. $S \supset (T \& U), \sim V \equiv (T \vee R) \vdash S \supset (\sim V \vee \sim R)$
12. $\sim P \vee \sim Q \vdash \sim (P \& Q)$
13. $\vdash (Q \& S) \vee (R \vee \sim R)$

PART E. SYMBOLISATION IN PREDICATE LOGIC

Symbolise in Predicate Logic with Identity, using the following key:

Domain: People

Px – x is a politician t – Tony Blair

Bx – x is a Prime Minister of Britain

Kxy – x knows y

14. Not only politicians know Tony Blair.
15. There is at least one person whom nobody knows.
16. Everyone knows someone who knows someone who knows Tony Blair.

[Note: 'someone' in this sentences is *not* meant to be read as 'some *particular* person', so you can ignore the ambiguity.]

17. There is at most one Prime Minister of Britain.

PART F. SYNTAX AND SEMANTICS OF PREDICATE LOGIC

18. Give an example of a sentence of English which is scope ambiguous. Can a sentence of Predicate Logic be similarly ambiguous? Explain your answer.
19. Provide an interpretation to show that the following argument is quantificationally invalid:

$\underline{(\forall x)(\exists y)Rxy}$

$(\exists y)(\forall x)Rxy$

20. If a sentence is quantificationally true when translated into Predicate Logic, does it follow that it is truth-functionally true when translated into Sentential Logic? Explain your answer.

PART G. DERIVATIONS

Show that the following derivability claims hold in Predicate Logic:

21. $(\forall x)(Fx \& Gx) \vdash (\forall y)Fy \& (\forall y)Gy$
22. $(\exists x)(Fx \& \sim Gx) \vdash \sim (\forall x)(Fx \supset Gx)$
23. $(\exists x)(Mx \& x = c), c = d, (\forall x)(Mx \supset Nx) \vdash Nd$

END OF PAPER