

FIRST M.A. EXAMINATION

Philosophy (PY1003)

May 2004 – Time allowed: 1<sup>1</sup>/<sub>2</sub> hours

INTRODUCTION TO LOGIC

Answer **all** questions.

1. Decide the validity of the following sequents using a semantic tree. If they are invalid exhibit explicitly a counterexample.
  - a.  $\neg(A \leftrightarrow B), B \leftrightarrow (C \vee D), \neg A \mid \text{---} C$
  - b.  $A \wedge (B \vee \neg C), \neg(A \wedge B \wedge C) \mid \text{---} \neg C$
  
2. a. Formalise the following sets of sentences into the language of first order logic.  
Exhibit clearly a key and specify any domain of discourse you employ.
  - (i) {All dogs are mammals. All cats are mammals. All dogs are not cats}
  
  - (ii) {Someone is pompous. No one likes anyone who is pompous. Everyone is liked by someone}

b. Test, using a semantic tree the consistency of the sets of formulas obtained from

i) and from ii) above. If they are consistent exhibit explicitly a model.

3. Determine using semantic trees the validity of the following inferences. If they are invalid exhibit explicitly a counterexample.

a.  $\forall xFx \rightarrow P \quad | \text{---} \quad \neg \forall x(Fx \wedge \neg P)$

b.  $\forall x(Fx \vee Gx) \quad | \text{---} \quad \forall xFx \vee \forall xGx$

c.  $\forall x(Fx \rightarrow Gx) \quad | \text{---} \quad \forall xFx \rightarrow \forall xGx$

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