

FIRST M.A. EXAMINATION

Philosophy (PY1003)

May 2005 – Time allowed: 1¹/₂ hours

INTRODUCTION TO LOGIC

Answer **all** questions.

**DO NOT repeat material between questions,
or between examination questions and assessed essays.**

1. Decide the validity of the following sequents. Use truth-trees to justify your reasoning. If the sequent is invalid, explicitly exhibit a counterexample. (6 marks)

i. $A \rightarrow B, \neg (B \wedge C) \mid - \neg A$

ii. $A \leftrightarrow C, \neg (B \vee C) \mid - \neg (A \vee C)$

iii. $\neg (A \vee B), C, C \rightarrow B \mid - D$

2. Translate the following argument into the language of/

2. Translate the following argument into the language of sentential logic, providing a translation key. Determine whether or not the argument is valid. Use a truth-tree to justify your reasoning. If the argument is invalid, explicitly exhibit a counterexample. (5 marks)

The train will be on time unless either there is a signal failure or there are leaves on the track. There are only leaves on the track in autumn, and it is not autumn now. So the train will be late if and only if there is a signal failure.

3. Determine whether or not the following sets of formulae are consistent. Use truth-trees to justify your reasoning. If the set is consistent, explicitly exhibit a model. (6 marks)

i. $\{\forall x \neg Rx \rightarrow \neg \forall x Hx, \exists x Rx, \exists x Hx\}$

ii. $\{\forall x (Rx \rightarrow Hx), Ra, \neg Hb, a=b\}$

4. Translate the following arguments into the language of predicate logic, providing a translation key. Use truth-trees to determine whether each argument is valid. If an argument is invalid, explicitly exhibit a counterexample. (8 marks)

i. The King of England is rich. Therefore, there is a unique King of England.

ii. Nobody likes anybody who is arrogant. Juan is not arrogant. Therefore, someone likes Juan.
