

PHILOSOPHY TRIPOS Part II

Thursday 1 June 2000

1.30 to 4.30

Paper 7

MATHEMATICAL LOGIC

*Answer **three** questions only.*

- 1 Sketch a proof of the strong completeness of some deductive system for first-order logic without identity. How should your proof be adapted to deal with the addition of identity as a logical constant?
- 2 What is a logic for? Is second-order logic really a logic?
- 3 Compare and contrast first-order Peano Arithmetic, first-order complete arithmetic and second-order Peano Arithmetic. Comment on the significance of the differences between these theories.
- 4 Does Gödel's first incompleteness theorem deal a death-blow to logicism?
- 5 Discuss the differences between logical systems with and without the Cut rule.
- 6 What is the significance of the ordinal ω for Peano Arithmetic?
- 7 Are impredicative proofs problematic?
- 8 Sketch an account of the arithmetic of ordinal numbers.
- 9 'The truths of arithmetic do not determine the standard model up to isomorphism.' Explain and discuss.
- 10 What is a computable function?

END OF PAPER