

**PHILOSOPHY TRIPOS Part IA**

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Tuesday 31 May 2005

9 to 12

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Paper 3

LOGIC

*Answer **four** questions only; at least **one** from each section.*

*Write the number of the question at the beginning of each answer.  
Please answer **all parts** of each numbered question chosen.*

**STATIONERY REQUIREMENTS**

*20 Page Answer Book x 1*

*Rough Work Pad*

**You may not start to read the questions  
printed on the subsequent pages of this  
question paper until instructed that you  
may do so by the Invigilator**

SECTION A

- 1
  - (a) Discuss the notion of validity, with particular reference to the formal language  $QL=$  (the language of the predicate calculus with identity).
  - (b) Show that  $\forall x \forall y (x = y \supset (Fx \supset Fy))$  is a logical truth of  $QL=$ , using the tree method.
  - (c) Using the notion of a valuation or an interpretation, discuss briefly what it is for  $QL=$  to be an extensional language and use examples to contrast it with an intensional language.
- 2
  - (a) If  $R$  is any relation, formulate, in the language of  $QL=$  (the language of the predicate calculus with identity), what it is for  $R$  to be (i) reflexive, (ii) symmetric, (iii) transitive. Give a different example for each.
  - (b) What is the name given to a relation  $R$  which is reflexive, symmetric and transitive? Give an example of such a relation other than the identity relation and the examples you've already used.
  - (c) If  $R$  is the identity relation, show that your answers for (i), (ii) and (iii) in (a) above are logical truths of  $QL=$ , using the tree method.
  - (d) Give an example of an  $R$  which is neither reflexive nor symmetric, but is transitive. Give an example of an  $R$  which is symmetric and transitive, but not reflexive.
- 3 Translate the following sentences into  $QL=$  (the language of the predicate calculus with identity), explaining the translation scheme you use.
  - (a) Socrates, being wise, is admired by all wise philosophers.
  - (b) Some wise philosophers hate all non-philosophers who are not wise.
  - (c) Some philosophers are hated by Keira, but all philosophers love her.
  - (d) Only Orlando loves Keira and Natalie.
  - (e) Keira is not the only one who loves some philosopher.
  - (f) Unless someone famous is happy, Natalie is not happy.
  - (g) Only if everyone who comes has met someone famous is Natalie happy.
  - (h) Orlando does not like every actress who likes him.
  - (i) At least two people love Orlando, if Natalie isn't Keira.
  - (j) At most three actors are good philosophers.
  - (k) The actress who loves Orlando is either Natalie or Keira.
- 4 Show that the following arguments are valid by translating them into  $QL=$  (the language of the predicate calculus with identity) and using predicate trees:
  - (a) All dogs are stupid. All stupid creatures are friendly. No friendly creature is

sane. Hence, no dog is sane.

**[TURN OVER for continuation of question 4]**

- (b) Some drop-outs love Scooby. All stupid creatures love any drop-out. Scooby is stupid. Hence, there is someone who both loves and is loved by Scooby.
  - (c) Some dogs are faithful only to drop-outs. No drop-outs are clever. Any furry creature is faithful to someone clever. Therefore, not all dogs are furry creatures.
  - (d) At least one creature loves Shaggy. No one who isn't Scooby loves Shaggy. So Scooby loves Shaggy.
  - (e) The author of *Nausea* wrote *Being and Nothingness*. Hence, at least one person wrote *Nausea*.
  - (f) Jean-Paul is the only existentialist whom Simone loves. There are at least two existentialists. Therefore there's someone whom Simone doesn't love.
- 5
- (a) Define the notions of (i) conditional probability, (ii) independent event and (iii) exclusive event.
  - (b) If someone believes to degree 0.7 that it will rain and to degree 0.8 that it will not rain, what is the significance of saying that a 'Dutch Book' can be made against them? Construct such a Dutch Book, given these degrees of belief.

## SECTION B

- 6 Why might empty definite descriptions seem puzzling? How would you solve the puzzles?
- 7 According to standard logic, 'If it is raining, then it is not raining' is true when it is not raining. How should we view this situation?
- 8 All plane figures with three sides have three angles. What sort of truth is this, and how do we know it?
- 9 'A statement is meaningful iff it is verifiable.' Can this account of meaning be defended?
- 10 What is an indexical expression? What complications do they make for explaining the uses of words such as 'statement' or 'proposition'?

END OF PAPER

- 4 -

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