PHILOSOPHY TRIPOS   Part IA

Tuesday 30 May 2006   9 to 12

Paper 3

LOGIC

Answer **three** *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   Attempt all parts of this question.

   (a) Suppose
           'm' denotes Morris
           'n' denotes Nancy
           'o' denotes Oswald
           'Fx' means *x is a philosopher*
           'Gx' means *x is wise*
           'Lxy' means *x likes y*

   Take the domain of quantification to be people. Then translate the following
   into QL= as best you can, commenting on any problem cases.

   (i)   Morris and Oswald like everyone.
   (ii)   Only if Morris likes Nancy does every philosopher like her.
   (iii) Every philosopher who likes Nancy likes someone wise.
   (iv)   No wise philosopher likes everyone whom Oswald likes.
   (v)   Everyone likes someone whom Nancy likes.
   (vi)   Only philosophers like Oswald, and not even all of them.
   (vii) Morris only likes Nancy.
   (viii) Only Oswald likes any philosophers.
   (ix)   Exactly two philosophers like Nancy.
   (x)   The only person whom Morris likes is Nancy.

   (b) Carefully state the tree-rules that we need to add to those for connectives
   and quantifiers to deal with identity. Use trees to assess the following
   arguments:

   (i)   Some chaotic attractors are not fractals. All Cantor sets are
            fractals. Hence some chaotic attractors are not Cantor sets.

   (ii)   Only if Owen is happy does he love someone. If there's anyone
            who loves Nerys, then Owen does. Maldwyn loves Nerys. So
            Owen is happy.

   (iii) Only Bertrand is a great philosopher. Russell is a great
            philosopher. Hence Bertrand is none other than Russell.

   (iv)   The one and only person who composed the Illiad composed the
            Odyssey. Homer composed the Illiad. Hence Homer composed
            the Odyssey.

   (v)   Any cat is a mammal; so any cat's tail is a mammal's tail.

   (vi)   There's a town to which all roads lead. So all roads lead to a
            town.

[TURN OVER]

2   Attempt all parts of this question.

    (a) Carefully define the notions of:
        (i)   a truth-function
        (ii)   a truth-functional connective
        (iii) an expressively adequate set of connectives
        (iv) tautology
        (v)   tautological entailment
        (vi) tautological consistency
    Also explain carefully the differences and relations between what is symbolized by '$\therefore$', '$\supset$', and '$\models$'

    (b) Prove that the set of connectives $\{\supset, \neg\}$ is expressively adequate.

3   Attempt all parts of this question.

    (a)
        (i)   Define the following terms: Subset; Proper Subset; Union; Intersection.
        (ii)   Show that if A is a subset of B and B is a subset of C then A is a subset of C.
        (iii) Does the statement in *(ii)* remain true if we replace all occurrences of the word 'subset' with 'proper subset'? Justify your answer.
        (iv) Write down the axiom of extensionality. Use it to show that A=B if and only if neither A nor B is a proper subset of A$\cup$B.

    (b)
        (i)   Define the following terms: Conditional Probability; Independent Events; Exclusive Events.
        (ii)   The town of Erinsborough contains just as many boys as girls. What is the probability that a child picked at random from Erinsborough High School is a girl?
        (iii) What is the probability that exactly one out of three randomly picked children is a girl?
        (iv) You see two children walking towards you from a distance. You then learn that the one on the left is a girl. What is the probability that the one on the right is a girl?
        (v)   You see two children walking towards you from a distance. You then learn that one of them is a girl (but you can't tell which). What is the probability that the other one is a girl? Explain any difference you find between this case and the one described in *(iv)*.

[TURN OVER]

SECTION B

4   What is the problem Russell's Theory of Descriptions is intended to solve? Does it provide a good solution?

5   Is Verificationism defensible?

6   "But, for all its a priori reasonableness, a boundary between analytic and synthetic statements simply has not been drawn. That there is such a distinction to be drawn at all is an unempirical dogma of empiricists, a metaphysical article of faith". (Quine) Discuss.

7   What are the paradoxes of material implication? How would you resolve them?

8   How would you distinguish sentences, statements and propositions?

END OF PAPER