

UNIVERSITY OF LONDON

M.Phil. EXAMINATION
for Internal Students

PHILOSOPHY

Philosophy of Mathematics

Wednesday, 10 May 2006: 10.00 – 13.00

Candidates should answer **THREE** of the following **TWELVE** questions, avoiding overlap in their answers, also between papers.

1. Should we take mathematics to be about structures rather than objects?
2. Why is it a mistake, if it is, to hold that mathematical geometry should be an empirical subject?
3. What role, if any, does abstraction play in our mathematical understanding?
4. Discuss the following passage from Kant's *Critique of Pure Reason*:
 'Thus I construct a triangle by exhibiting an object corresponding to this concept, either by imagination alone, in pure intuition, or on paper, in empirical intuition, but in both cases completely *a priori*, without having borrowed the pattern for it from any experience. The individual drawn figure is empirical, and nevertheless serves to express the concept without damage to its universality, for in the case of this empirical intuition we have taken account only of the action of constructing the concept, to which many determinations, e.g., those of the magnitude of the sides and the angles, are entirely indifferent' [A 713-4 / B 741-2].
5. 'Nothing is *the* number k . Any k things constitute a k .' Is there a satisfactory understanding of number theory compatible with this schema?
6. Is there any cogent reason for asserting or for denying that there are actually infinite sets?
7. Is the mathematics of number part of logic?
8. Explain and assess Hilbert's Programme.
9. EITHER (a) What is Tarski's theorem on the undefinability of truth, and what is its significance?
 OR (b) What is Gödel's First Incompleteness Theorem, and what is its significance?
10. Do general facts about linguistic meaning provide a basis for rejecting classical mathematics in favour of intuitionistic mathematics?
11. 'Mathematical objects and facts are not eternal but are mentally constructed by us.'
 Discuss.
12. 'Quantification over mathematical entities is indispensable for science, both formal and physical; therefore we should accept such quantification; but this commits us to accepting the existence of the mathematical entities in question' (Putnam). Is this right?

END OF PAPER