# 2000 Paper 8 Question 2

**Specification and Verification I**

Describe how Floyd–Hoare logic can be used to define the semantics of programming languages (axiomatic semantics). Give advantages and disadvantages of this approach. [5 marks]

Describe the general idea of how program verification may be mechanised using verification conditions. Discuss what can be done completely automatically and what requires manual assistance. [5 marks]

Describe the difference between deep and shallow semantic embeddings of one language in another and compare and contrast the benefits of each. What is the point of embedding Floyd–Hoare logic in higher order logic? [5 marks]

Discuss possible commercial uses of formal software verification. How would you justify its use? [5 marks]