

2005 Paper 10 Question 9

Computation Theory

- (a) Explain informally, i.e. without reference to any particular model of computation, why the *Halting Problem* is undecidable. [6 marks]
- (b) Briefly describe two mathematical problems, other than the Halting Problem, that are algorithmically undecidable. [4 marks]
- (c) What does it mean for a partial function to be *register machine computable*? Show how the informal argument in part (a) can be turned into a rigorous proof that there is no register machine deciding the Halting Problem for register machine computable functions. [10 marks]