

## 2004 Paper 12 Question 8

### Artificial Intelligence

- (a) Describe the way in which a problem should be represented in order to allow its solution using a *heuristic search* technique. [5 marks]
- (b) Define what it means for a search algorithm to be *complete*, and to be *optimal*. [2 marks]
- (c) Define what it means for a heuristic function to be *admissible*, and to be *monotonic*. [2 marks]
- (d) Describe the operation of the  $A^*$  heuristic search algorithm. [5 marks]
- (e) Prove that the  $A^*$  heuristic search algorithm is optimal when applied in conjunction with a monotonic heuristic. State the conditions under which the algorithm is also complete, and explain why this is the case. [6 marks]