## 2004 Paper 2 Question 1

**Multi-part question**

Answer all parts.

(*a*)  Name at least *four* different types of ethical theory.                    [4 marks]

(*b*)  You are building a flight-control system for which a convincing safety case must be made. Would you assign the tasks of safety requirements engineering, test case development and assurance documentation to a separate team, or distribute them among your developers? Justify your answer briefly.
                                                                                   [4 marks]

(*c*)  Describe two particular features of ML and two (different) features of Java that might be expected to help the process of designing, implementing, debugging or maintaining high quality programs in a cost effective manner.  Explain whether the features you have noted are ones that come into play for all users or if they are capabilities that a user can choose to use or to ignore.   [4 marks]

(*d*)  Draw a state diagram for a *deterministic finite automaton* that accepts $w \in \{a, b\}^*$ if, and only if, $w$ either begins with $a$ and is of odd length or begins with $b$ and is of even length.                    [4 marks]

(*e*)  A (ROM) Read Only Memory has 8 address inputs and 8 data outputs. Estimate how many two-input gates would be required, on average, to perform the function of the ROM.                    [4 marks]