

## 2004 Paper 2 Question 9

### Regular Languages and Finite Automata

(a) Prove that if  $L$  is a regular language, its complement is also regular. [6 marks]

(b) For each of the following languages over the alphabet  $\{a, b\}$ , state whether or not it is regular and justify your answer.

(i)  $\{w \mid w \text{ is not a palindrome}\}$

(ii)  $\{a^k \mid k \text{ is a multiple of } 3\}$

(iii)  $\{a^k \mid k \text{ is prime}\}$

[14 marks]