# 2000 Paper 4 Question 1

**Concurrent Systems**

In a proposed, next-generation banking system a number of transactions are to be scheduled to run concurrently:

- Debit ($D$) transactions to make payments from customer accounts to a credit card company.

- Interest ($I$) transactions to add daily interest to customer account balances.

- Transfer ($T$) transactions which first check whether the source account contains sufficient funds then either abort or continue the transfer from source to destination accounts. Customer $x$ is running a $T$ to transfer £1000 from $A$ to $B$. Customer $y$ is running a $T$ to transfer £200 from $B$ to $A$.

(*a*) Discuss the potential for interference between any of these transactions.

[7 marks]

(*b*) Demonstrate the effect of concurrency control based on strict two-phase locking in relation to the discussion in (*a*). [8 marks]

(*c*) Comment on the scope of concurrency control in relation to the discussion in (*a*). [5 marks]

[Hint: you may assume that operations on bank account objects, such as debit, credit and add-interest are atomic.]