

## COMPUTER SCIENCE TRIPOS Part IB – 2012 – Paper 5

### 9 Concurrent and Distributed Systems (SMH)

- (a) Many distributed systems make use of replication.
- (i) Give *two* advantages and *one* disadvantage of using replication. [3 marks]
  - (ii) Distinguish *weak consistency* and *strong consistency*. What is the primary disadvantage of using the latter? [3 marks]
  - (iii) Describe how to commit a transaction in a distributed transaction processing system in which objects are replicated on different servers. [4 marks]
- (b) Group communication can be achieved via *ordered multicast*. Describe how you would build an ordered multicast system which preserves *causal ordering*. [6 marks]
- (c) You are part of a team tasked with building a distributed filing system. One of the requirements is that it must be possible to revoke access rights to a file within  $T$  milliseconds ( $T \geq 0$ ). Describe how you could achieve this, commenting on how the value of  $T$  would influence your decision. [4 marks]