

Section A

1. There is at least one school of thought that asserts that massively distributed systems will become available in the medium term. Write a report that discusses the fundamental issues that must be addressed to allow construction of applications that can make effective use of such architectures. [25]

2.
 - a) In distributed systems there is a conflict between high availability/performance and data consistency. Explain why this arises. [5]

 - b) Discuss the requirements for consistency and availability in the following cases:
 - i) A distributed drawing package, used by a design team in designing a nuclear power station.

 - ii) A dynamically changing map available to a tank commander showing the position of friendly forces on a battlefield. [6]

 - c) What mechanisms should be used to ensure consistency in both scenarios? In answering this, you should describe very carefully the behaviour you would expect of the system in the presence of node, link, and partition failures and then demonstrate that your mechanisms realise this behaviour. [14]

3. An *election* server exports two remote methods, one to record votes and one to allow an election official to determine the results. Access to the server is by RPC (or RMI).
 - a) Give and explain an interface definition for such a server. [4]

 - b) Explain the process of argument marshalling with reference to the election server. [8]

 - c) Discuss the effects of different RPC call semantics on the election service. [4]

 - d) What advantages or disadvantages would a transactional approach have over one based purely on RPC. [9]

[END OF SECTION A]