THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATION
Diploma

COMPUTER NETWORKS

6th May 2003, 10.00 a.m.-12.00 p.m.
Answer FOUR questions out of SIX. All questions carry equal marks.
Time: TWO hours.

*The marks given in brackets are **indicative** of the weight given to each part of the question.*

1. *a)* Outline the protocols used for addressing and routing the OSI datagram and virtual circuit services offered by the network layer. **(14 marks)**

b) Discuss the relative merits and limitations of the two services. **(11 marks)**

2. *a)* Describe clearly, including advantages and disadvantages, 1-persistent, non-persistent and p-persistent CSMA. (**12 marks)**

b) Describe the function of repeaters, bridges and routers. Your description should include details of the purpose of each and details of the levels of the OSI 7-Layer Reference Model at which they operate. **(8 marks)**

c) Identify THREE types of cabling technology which may be used in a 10-Mbps Ethernet network. What are the advantages and disadvantages of each? **(5 marks)**

3. *a)* What is the role of the LLC and MAC layers in the IEEE architecture? How do these layers compare with those in the ISO OSI 7-Layer Reference Model? **(8 marks)**

b) Explain why direct connection to an FDDI network is not usually recommended. **(2 marks)**

c) With the aid of suitable diagrams, show how the FDDI "wrap" mechanism may be used to maintain network viability in the case of:
i) link failure
ii) node failure. **(10 marks)**

d) Using diagrams where appropriate, show how a *translation bridge* may be used to link an Ethernet LAN to an FDDI backbone. **(5 marks)**

4. *a)* Define the term *latency* when used in the context of a data network. **(2 marks)**

b) Describe a common approach for measuring latency within a data network. **(2 marks)**

c) Describe FOUR contributors to latency within a data network, and the way in which they contribute to the ordinary type. **(16 marks)**

d) Given a network with an unacceptable latency, what should be done to analyse the cause and to overcome problems? **(5 marks)**

5. *a)* Define and explain the term QoS (Quality of Service) and how it can be achieved in data networks. **(1 mark)**

b) Define the terms *availability*, *reliability*, *resilience* and *serviceability* when used in the context of data networks. **(8 marks)**

c) Describe FOUR examples of threats to network security. **(8 marks)**

d) Describe FOUR countermeasures that can be employed to remove or reduce the threats to network security. **(8 marks)**

6. *a)* Mobile computing has a number of requirements and places a number of demands on computer networks. What are these requirements and demands? **(14 marks)**

b) Describe the performance considerations that must be addressed when implementing mobile computing. **(6 marks)**

c) Describe *client server* computing. How does network use differ between *thin client* and *client server*? **(5 marks)**