THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATION
Professional Graduate Diploma

NETWORK INFORMATION SYSTEMS

27th April 2001 – 2.30 p.m. – 5.30 p.m.
Answer THREE questions out of FIVE. All questions carry equal marks
Time: Three hours.

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

The following passage refers to questions 1 and 2 ONLY:

E-markets.com is a small, privately owned company specialising in financial services to trading banks across the UK and Europe. The company provides financial information through standard Web servers, such as Apache and Netscape Netcenter, and a system wide data model to enable integration from different content providers. The company employs Unix servers in the UK, and has various Windows NT based platforms in other parts of the world (a migration to Windows 2000 is being discussed within the company).

1. E-markets.com is interested in extending their services to individuals in Europe and you have been appointed as their chief technology adviser.

    a) Identify specialised devices that could be used to enable mobile connectivity by individuals who wish to gain access to the E-markets.com Web based system. **(10 marks)**

    b) Discuss how these specialist devices could be connected to the E-markets.com backbone network, indicating any potential problems. **(15 marks)**

2. E-markets.com deals with many content providers who use their own specialised information systems, some of which have been in existence for a very long period of time.

    a) Produce a policy for integrating their content providers' information systems within the E-markets.com financial system. **(12 marks)**

    b) Discuss the issues you would consider, and the strategy you would adopt, in order to support the migration from the existing systems to the integrated system. **(13 marks)**

3 a) Describe three operations that could be performed with a Domain Name Server (DNS), in order to support applications such as electronic mail. **(12 marks)**

    b) Given the following address, www.mcs.anl.gov, describe in detail how a DNS server can be used to resolve the address to its one or more IP addresses. **(13 marks)**

The following passage refers to questions 4 and 5 ONLY:

cBay specialises in providing on-line auctions of services and goods, supporting person-to-person auctions. Businesses are also now being targeted to buy and sell items in more than 1,000 categories, including collectibles, antiques, sports memorabilia, computers, toys, beanie babies, dolls, figures, coins, stamps, books, magazines, music, pottery, glass, photography, electronics, jewellery, gemstones, and much more. Users can find the unique and the interesting on cBay, everything from chintz china to chairs, teddy bears to trains, and furniture to figurines.

cBay has decided to extend its operations into Europe, and is evaluating various networking infrastructures to decide on the best systems for running their European operations. Currently, cBay employ Sun UltraSparc servers to host electronic catalogues, maintained on either Oracle or Informix database management systems. The company is planning on additional servers to promote interactive customer dealings. The European clientele is likely to be more enthusiastic about auctions in antiques than the US market. New auctions are to be posted daily on cBay European web pages so that there will always be something new to look at. cBay's system of proxy bidding encourages buyers to offer the most they are willing to pay for an item generally referred to as the ``maximum bid''. However, a buyer does not necessarily end up paying the ``maximum bid''. Each buyer is also allowed a ``bid increment'' from as little as 5 pence.

To enable automated auctions, cBay is also evaluating various software that would enable them to be on-line 24 hours a day, 7 days a week. A user (buyer or seller) could deploy a program to automatically perform the auctions on their behalf. The program would be parameterised with options such as ``maximum bid'', ``bid increment'' etc, and could then perform the actual auction dynamically only informing the user when a conflict arises, or when a sale has been made. To automate this operation, cBay are evaluating various networked machines, employing message passing middleware. They have looked at MPI and also solutions from Microsoft such as Wolfpack. Their intention is to enable cross platform integration of buyers and sellers connected across a network, and also to enable better performance than is generally present over the single server web engines.

4   Security is of primary concern to cBay, especially when automating auctions over the Internet.

Discuss the factors that you think are relevant when choosing a computing platform that will support Internet security and which reflects the particular needs of cBay.   **(25 marks)**

5.   cBay would like to incorporate small Local Area Networks (LANs) in use by various local auction houses. Rather than support a single network and a database that maintains information centrally at cBay, a manager at cBay has proposed the building of a network of LANs.

a)   Evaluate the manager's proposal.   **(8 marks)**

b)   Describe a suitable architecture which may be used to implement a network of this kind.   **(17 marks)**