

**THE BRITISH COMPUTER SOCIETY**  
**THE BCS PROFESSIONAL EXAMINATION**  
**Diploma**

**COMPUTER NETWORKS**

13th October 2004, 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. With reference to IP addressing, explain how you could determine whether an address is a Class A, B or C address. **(5 marks)**
  - a) What is the purpose of a subnet mask? Show how it works with the aid of a diagram. **(8 marks)**
  - b) Your organisation has been assigned the Class C address of 200.127.12.0 and your network administrator has assigned the subnet mask of 255.255.255.224.
    - i) How many sub-networks can you have on this network? Clearly show how you obtained your answer. **(6 marks)**
    - ii) How many nodes can be supported on each of these sub-networks? Again, clearly show how you obtained your answer. **(6 marks)**
2.
  - a) Explain what is meant by the term *protocol layering*. **(6 marks)**
  - b) By means of a protocol layer diagram show how data can be transferred between two end-stations, clearly illustrating how data passes through protocol layers and what is meant by the term *peer to peer* protocol. **(8 marks)**
  - c) With reference to the ISO 7 layer Reference Model, explain what functions are performed by the Data-Link layer. **(5 marks)**
  - d) What function is performed by the IEEE 802 LLC and MAC layers? Show how these relate to the ISO 7 layer Reference Model. **(6 marks)**
3.
  - a) Describe how a communications protocol is able to guarantee the delivery of data through a network by adopting a 'sliding window' packet acknowledgement system. **(9 marks)**
  - b) What is meant by the term *flow control* and show how this can be achieved by a communications protocol? **(8 marks)**
  - c) Explain how TCP is able to guarantee the transfer of data across a network. **(8 marks)**

**Turn over]**

4. a) The integrated services digital network services is commonly supplied in a 2B+D interface. Explain the characteristics of the B and D channels. **(12 marks)**
- b) Why is congestion control vital to the operation of ATM networks? Discuss the THREE types of strategies used in congestion control in ATM networks. **(13 marks)**
5. a) What are the essential differences between a connection-oriented service and a connectionless service at the network layer level? **(7 marks)**
- b) List and discuss the advantages and disadvantages of bridges relative to a repeater. **(10 marks)**
- c) What is the domain name system (DNS)? Explain how the domain naming system operates when an e-mail message is sent to an address. **(8 marks)**
6. a) What is client server computing? Discuss the features of client server architectures that use fat clients and thin clients. **(10 marks)**
- b) Compile a list of capabilities and use it to explain the objectives that characterise the third generation wireless communication. **(10 marks)**
- c) Explain the disadvantages of using wireless communication in networking applications. **(5 marks)**