

OLLSCOIL NA hÉIREANN
THE NATIONAL UNIVERSITY OF IRELAND, GALWAY

SUMMER EXAMINATIONS 2000

Higher Diploma in Software Design/Development
B.A.Degree
B.E.(Industrial and Information Systems)
Computer Communications CT866

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Time allowed: TWO hours
Answer Q1 and two other questions.
All questions carry equal marks

- Q1.** (i) What are the advantages of a layered approach to a network architecture ? (5)
- (ii) Whilst surfing the web from home via an Internet Service Provider (ISP), you download a page from a web server in the US. Outline and explain briefly, the contribution of the various TCP/IP protocols that collectively carry out this task. (30)
- Q2.** (i) Distinguish between circuit and packet-switched networks. (5)
- (ii) Explain briefly and generally how modems are used to transmit data over the analogue local loop in the POTS (Plain Old Telephone System). (10)
- (iii) Domestic users are demanding increasing levels of bandwidth from the local loop of the POTS. Discuss the present limitations and evaluate some possible solutions. (20)

- Q3.** (i) Outline in brief the essential functions of the Data Link Layer. (5)
- (ii) Evaluate the IEEE 802.3 standard focusing in particular on the environments to which it is **both** suited and non-suited. (12)
- (iii) The continuous upgrading of network infrastructure to provide higher bandwidth connections is a challenge faced by many network administrators.
Within this context, briefly evaluate the following high-speed alternatives available to network administrators:
- FDDI
 - Gigabit Ethernet
 - Fast Ethernet
 - ATM
- If transmission of delay-sensitive data is a further requirement, which of the above would you recommend and why? (18)
- Q4.** (i) Describe the main features of the network-layer Internet standard IP (10)
- (ii) Describe in some detail, the Internet standard OSPF (Open Shortest Path First) routing protocol, using a simple subnet to illustrate your answer. (15)
- (iii) Answer either (a) **or** (b):
- (a) Evaluate the role that the new Internet protocol IPv6 will play in the Internet of the future.
- (b) As network administrator for a financial institution, you are required to design and implement a **firewall** with advanced security features. Outline your main concerns and show how these might be addressed. (10)
- Q5.** (i) Outline the need for **and** the operation of the *3-way handshake* connection establishment protocol. (6)
- (ii) *Most of the Internet's end-user applications that require reliable service utilise TCP over IP.* Discuss this statement focusing on how the TCP segment header is designed to deliver such service. (15)
- (iii) Answer any two (2) of the following:
- Discuss the need for **and** operation of DNS (Domain Name System).
 - Show how TCP congestion control policy alleviates Internet congestion.
 - Evaluate briefly the role of Public key algorithms in Internet security. (14)