

**OLLSCOIL NA hÉIREANN**  
THE NATIONAL UNIVERSITY OF IRELAND, GALWAY

SUMMER EXAMINATIONS 2001

Higher Diploma in Software Design/Development (CT 866)

3<sup>rd</sup> BA IT (CT 866)

4<sup>th</sup> IEIS (CT 351)

***Computer Communications***

Professor D. Bell

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Time allowed: TWO hours

**Answer any 3 questions.**

All questions carry equal marks

- Q1.** (i) Outline the main characteristics of the following transmission media, indicating where each might be used within a network architecture:
- (a) Twisted Pair
  - (b) Coaxial Cable
  - (c) Fibre-Optic Cable
- (15)
- (ii) Distinguish between analogue and digital data transmission, focusing on their respective advantages and disadvantages. Which is better for data transmission and why?
- (10)
- (iii) Briefly evaluate ATM (Asynchronous Transfer Mode) technology focusing in particular on its QoS (Quality-of-Service) features.
- (10)
- Q2.** (i) Describe in some detail the operation of the POTS (Plain Old Telephone System), focusing on its use for **voice** transmission.
- (15)
- (ii) Briefly describe the requirement for and operation of modem's to facilitate data transfer across the POTS. Explain also how K56 modems can deliver higher datarates than conventional modems.
- (10)
- (iii) The bandwidth requirements of domestic Internet users is constantly increasing. Briefly describe **and** evaluate some possible solutions.
- (10)

- Q3.** (i) Distinguish between error detection and error correction policies, outlining where each might best be used.  
(8)
- (ii) In recent years, Ethernet LANs have greatly surpassed Token Ring LANs in popularity. Describe **and** compare the operation of **both** LAN standards and explain why network administrators are increasingly choosing the former.  
(20)
- (iii) Write a brief note on the recent developments in wireless LANs.  
(7)
- Q4.** (i) Outline the background to the development of the new IP protocol IPv6 and the role that it will play in the future development of the Internet.  
(10)
- (ii) Many Internet applications utilise the transport-layer TCP protocol to provide effective data transfer. Describe in some detail how TCP provides this QoS (Quality of Service).  
(20)
- (iii) The transfer of Multimedia data across the Internet is an increasingly important Internet requirement. What transport layer protocol is generally used and why?  
(5)
- Q5.** (i) Network security is becoming an increasingly critical issue, requiring a multi-stranded strategy. Outline the principal threats and an overall security strategy.  
(10)
- (ii) Describe **and** distinguish between Secret **and** Public Key algorithms, focusing on where each might be used in a security strategy.  
(15)
- (iii) Briefly summarise the evolution of mobile telephony from 1<sup>st</sup> to 3<sup>rd</sup> Generation (3G) and outline the principal objectives of 3G.  
(10)