

# Ollscoil na hÉireann, Gaillimh

*National University of Ireland, Galway*

## Semester I Examinations, 2003/2004

Exam Code(s)	3BS1, 3BS9, 3CS1, 3CS2
Exam(s)	THIRD SCIENCE
Module Code(s)	CT351
Module(s)	Networking
Paper No.	1
Repeat Paper	Special Paper
External Examiner(s)	Prof. D. Bell
Internal Examiner(s)	Prof. G. Lyons
	Mr. A. Reilly

Answer 4 questions. All questions carry equal marks

### **Instructions:**

Duration	2 hrs
No. of Answer books	1

### **Requirements:**

Handout	
MCQ	
Statistical Tables	
Graph Paper	
Log Graph Paper	
Other Material	

No. of Pages	4
Department(s)	Information Technology

- Q1. (a) (i) Define what is meant by a computer network. (3)  
(ii) Using a simplified block diagram, show how an analogue signal can be used to transmit digital data. (6)
- (b) (i) Outline 3 characteristics of a computer network protocol. (6)  
(ii) Describe what protocol data units (PDUs) are and their role in the operation of the OSI model. (10)
- Q2. (a) Show how the bit sequence 01001101 is represented using Non Return to Zero-Inverted (NRZI) and Pseudoternary encoding. (6)
- (b) (i) Describe Pulse Code Modulation (PCM) is used to encode analogue data on a digital signal. (8)  
(ii) Calculate the PCM S/N ratio, if 256 quantisation levels are used. (3)
- (c) Given a 50km communications link with amplification of 25W and a transmission loss of 0.5dB/km, calculate the output signal strength in Watts if the input signal strength is 36dB. (8)
- Q3. (a) Distinguish briefly between  
(i) Unipolar and bipolar encoding  
(ii) Bandwidth and spectrum (4)
- (b) Describe briefly 2 methods of flow control in computer networks. (10)
- (c) Given the following pin assignment:
- |                        |                                     |
|------------------------|-------------------------------------|
| - Transmitted Data (2) | - Received Data (3)                 |
| - Request to Send (4)  | - Clear to Send (5)                 |
| - DCE Ready (6)        | - Received Line Signal Detector (8) |
| - DTE Ready (20)       | - Ring Indicator (22)               |
- describe how 2 computers can communicate via modems using the V.24/EIA-232-F interface standard. (11)
- Q4. (a) (i) Outline why security is important in a computer network. (5)  
(ii) List the main threats to network availability and data integrity. (6)
- (b) List the main differences between Local Area Networks (LANs) and Wide Area Networks (WANs). (6)
- (c) Describe briefly the 2 of the main LAN topologies.

Q5. Write short notes on 3 of the following (25)

- (a) SMTP Email Protocol
- (b) Synchronous Communication
- (c) Guided Transmission Media
- (d) Frequency Division Multiplexing
- (e) Data Transmission Impairments

Q6. (a) Distinguish between

- (i) Connection and Connectionless service (5)
- (ii) Unicast, Broadcast and Multicast transmission. (5)
- (iii) Static and Dynamic routing (5)

(b) Solve the routing diagram below between Belmullet and the other locations using Dijkstra's algorithm. (10)

