

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

SEMESTER 1 EXAMINATIONS 2002-03

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**THIRD SCIENCE**

***CT351 NETWORKING***

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Mr. A. Reilly

Time allowed: TWO hours  
Answer 4 questions. All questions carry equal marks

- Q1. (a) (i) Outline 3 characteristics of a computer network protocol. (6)  
(ii) Describe briefly the following protocol functions: (9)
- Encapsulation
  - Segmentation
  - Connection Control
- (b) Describe the operation of the 7 layer OSI model. (10)
- Q2. (a) Distinguish briefly between
- (i) Simplex, half duplex and duplex transmission.
  - (ii) Bandwidth and spectrum
  - (iii) Analogue and digital signalling. (7)
- (b) Describe the main impairments to data transmission across a medium. (9)
- (c) Given a 50km communications link with an output signal strength of 25dB, amplification of 30W and a transmission loss of 0.3db/km, calculate the input signal strength in Watts. (9)

- Q3. (a) Show how the bit sequence 00110110 is represented using Non Return to Zero-Inverted (NRZI), Manchester and Pseudoternary encoding. (6)
- (b) Describe the sliding window flow control in computer networks. (10)
- (c) Given a message  $M(X) = X^5 + X^3 + X^2 + X + 1$ , a divisor  $P(X) = X^4 + X^2 + X + 1$  and a 4 bit remainder R, calculate the frame, T(X), to be transmitted using cyclic redundancy error checking. (9)
- Q4. Write notes on any 3 of the following: (25)
- (a) LAN Topologies
- (b) Pulse Code Modulation (PCM)
- (c) Guided Transmission Media
- (d) Asynchronous Communication
- (e) B-ISDN
- Q5. (a) Using a diagram, describe the operation of virtual circuits and datagrams. (10)
- (b) (i) differentiate between static and dynamic routing. (3)
- (ii) Describe the static routing *flooding* technique. (6)
- (c) Describe briefly what is meant by a *null modem*. (6)
- Q6. (a) Describe the addressing mechanism in TCP/IP networks. (10)
- (b) (i) Describe what is meant by a URL on the world wide web and use an example to show its 3 constituent parts. (5)
- (ii) Outline the steps that occur between a user clicking on a hyperlink to a remote web page and the page being displayed on the user's screen. (10)