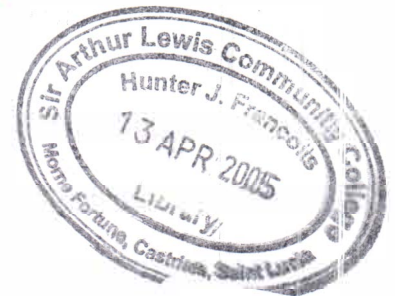


**SIR ARTHUR LEWIS COMMUNITY COLLEGE**  
**DIVISION OF TECHNICAL EDUCATION AND MANAGEMENT STUDIES**

**EXAMINATION SESSION** : End of Semester Examination  
**TUTOR** : Kurt Harris  
**PROGRAM TITLE** : Computer Systems Engineering  
**PROGRAM CODE** :  
**COURSE TITLE** : Data Communications  
**COURSE CODE** : ELE 210  
**CLASS** : 3EE-CMS-AD  
**DATE** : 30 November 2004  
**COMMENCEMENT TIME** : 1:00 PM  
**DURATION** : 2-1/2 Hr.  
**ROOM** : CMT – W1, EMT – W1  
**INVIGILATOR(S)** : C. Palmer, K. Harris



#D2

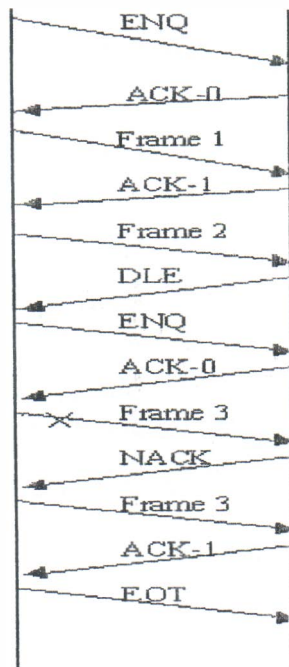


**INSTRUCTIONS**

There are *ten (10)* questions on this exam paper. Please answer *all* questions. Place your name on all sheets of paper submitted to the invigilator. This is a closed book exam. Calculators are permitted. The maximum number of marks is indicated at the end of each question. Use this as a rough guide to determine the depth to which each question will need to be answered. You have *two and a half (2 1/2)* hours to complete this exam.

1. (a) Distinguish between half-duplex and full-duplex communications (2)
- (b) Describe very briefly what is meant by 'bit stuffing' and 'bit stripping' in an HDLC context? (4)
2. (a) Explain the term "transmission medium". (1)
- (b) List and give a suitable application for a Line transmission system and a radio transmission system (3)
3. (a) Explain how the HDLC protocol ensures that the flag does not occur accidentally in data (4)
- (b) The RS232 Standard specifies the particular voltage levels, plug sockets and also the signals and "pins" which are to be used for controlling the flow of data; Indicate the use of the following pins: -  
Pin 7, Pin 2, Pin 3, Pin 4 and Pin 5. (5)
4. (a) List the major functions of a UART Receiver (3)
- (b) A UART receiver that is configured for 6 bits and even parity is connected to a transmitter that is configured for 8 data bits and no parity. Assume that both are operating at the same baud rate; **Explain** the error conditions you might expect to see in the receiver. (4)
- (c) What is the purpose of NAK (1)
5. By means of a labeled diagram, show the structure of a HDLC Information Frame (3)
6. (a) Briefly describe any **two** (2) of the following
  - (a) Telnet
  - (b) SMTP
  - (c) FTP
  - (d) POP- 3
  - (e) SNMP (4)
- (b) List the application oriented layers of the OSI Reference Model (3)
- (c) What is the difference between the session layer and the physical Layer (4)

7. The diagram below shows a half duplex idle RQ data exchange such as that used by the BSC data link layer. Explain the sequence of events, making clear the significance of the symbol above each arrow. (8)



8. (a) How is CRC used for error detection (3)  
 (b) Briefly explain one limitation of CRC (2)
9. (a) What is the function of the network and data link layers (2)  
 (b) The responsibility of the network layer includes Routing, Congestion control and Internetworking. What information is required to carry out these tasks? (4)  
 (c) Compare and contrast the major operational features of a bridge and a Router (4)
10. (a) Define the term protocol (1)  
 (b) List 3 benefits of standardization and explain any one (5)

*Total 70 marks*