NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
DECEMBER 2002 EXAMINATIONS

SUBJECT: DATA COMMUNICATIONS AND COMPUTER NETWORKS
CODE: SCS 6103

Instructions to candidate:

1. Answer any five questions
2. Each question carries 20 marks

3 HOURS

QUESTION ONE

a) Explain line modulation and give reasons why it is used in data transmission. [5]

b) Describe the following signal multiplexing techniques.

i. Time division multiplexing. [3]

ii. Statistical multiplexing. [3]

iii. Wavelength division multiplexing. [3]

c) (i) Draw a waveform to show the output of a line encoder using Manchester encoding if the input sequence is 1000110101. [4]

(ii) State any two advantages offered by Manchester encoding. [2]

QUESTION TWO

a) Discuss the following multiple access techniques.

(i) CSMA/CD [5]

(ii) DQDB [5]

(iii) ATM [5]

b) Draw a waveform to show the output of BPSK modulator if the following data sequence is an input: 101011001. [5]

QUESTION THREE

Name the seven layers of the OSI Model and briefly outline the functions of each layer. [20]

QUESTION FOUR

a) Explain the following switching methods.

    i) Circuit switching [4]

    ii) Packet switching [4]

    iii) Message switching [4]

b) Show how the message 1101010011 is sent using cyclic redundancy check if the generator is 10011. [8]

QUESTION FIVE

a) Show diagrammatically the comparison of TCP/IP suite to the OSI Model. [4]

b) Outline the functions of the following protocols in the TCP/IP suite.

    i. TCP [4]

    ii. IP [4]

    iii. ICMP [4]

    iv. ARP [4]

QUESTION SIX

Describe fully the operations of each of the following networking hardware.

    i. Bridge [5]

    ii. Hub [5]

    iii. Switch [5]

    iv. Router [5]

QUESTION SEVEN

a) Give four reasons for implementing Dynamic Host configuration Protocol. [5]

b) Briefly discuss the use of the following methods for network security.

    i. Passwords [5]

    ii. Firewalls [5]

    iii. Encryption [5]