KABARAK UNIVERSITY

UNIVERSITY EXAMINATIONS
MAIN/TOWN CAMPUS

SECOND SEMESTER, 2018/2019 ACADEMIC YEAR

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE, INFORMATION TECHNOLOGY, BACHELOR OF BUSINESS MANAGEMENT AND INFORMATION TECHNOLOGY, BACHELOR OF BUSINESS INFORMATION TECHNOLOGY AND BACHELOR OF EDUCATION(SCIENCE)

COMP 221/INTE 122/BBIT 122: DATA COMMUNICATION

STREAM: Y1S2, Y2S1 and Y2S2 **TIME: 9.00-11.00 AM**

EXAMINATION SESSION: JAN-APRIL **DATE: 8/04/2019**

INSTRUCTIONS:

1. Answer **QUESTION ONE** and any other **TWO** questions
2. Do not write on this question paper
3. Show your working clearly

QUESTION ONE (30 MARKS)

(a) Explain the distinction between circuit and message switching (4mks)

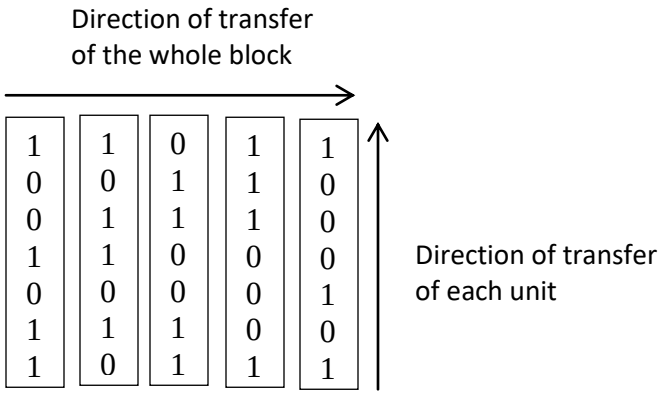
(b) Give and explain any three advantages of using a computer network (6mks)

(c) Compare and contrast between NRZ and MPE encoding schemes (6mks)

(d) Discuss *unicast* and *multicast* as methods of data communication (6mks)

(e) A 50KB document takes 1ms when downloaded by a Modem. Determine the data rate of the modem (assume there no system delays) (4mks)

(f) Suppose the block of five (5) characters shown below is transmitted using odd parity check. Determine



i. The vertical redundancy check (VRC) bits (2mks)
ii. The longitudinal redundancy check (LRC) bits (2mks)

QUESTION TWO (20 MARKS)

(a) With an illustration, explain the term *composite wave* as in signal transmission (3mks)

(b) Compare and contrast *baseband* and *broadband bandwidth* transmissions (6mks)

(c) State three factors that affect the maximum data rate of a channel (3mks)

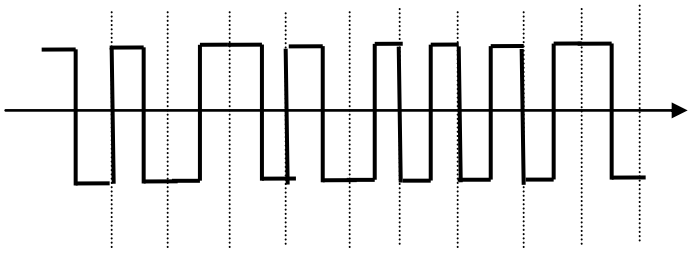
(d) The Maximum capacity of a noisy channel that transmits signals a bandwidth of 3000Hz is 27000bps

i. Determine the value of SNR (5mks)
ii. Determine the value of the Noise power in dB (3mks)

QUESTION THREE (20 MARKS)

(a) Give three advantages and three disadvantages of using Manchester phase encoding (MPE) encoding systems (6mks)

(b) Determine the input bit values for the following Differential Manchester encoding (DME) scheme (5mks)



(c) Use the input bit values in (b) to plot a NRZ, DME encoding and AMI modulation schemes (9mks)

QUESTION FOUR (20 MARKS)

(a) Describe *code division multiplexing (CDM)* as a mode of data transmission (4mks)

(b) State six differences between *packet* and *circuit* transmission (6mks)

(c) In synchronous time division multiplexing, three 10 bps connections are multiplexed together. Find

i. the duration of a bit before multiplexing, (2mks)
ii. the duration of a frame slot after multiplexing (2mks)
iii. the duration of a bit slot after multiplexing, (2mks)
iv. the transmission rate of the multiplexing link (2mks)
v. the transmission rate of a frame after multiplexing (2mks)

QUESTION FIVE (20 MARKS)

(a) Describe vertical redundancy check (VRC) (4mks)

(b) Compare and contrast *single-bit* and *burst* errors (6mks)

(c) In CRC error detection scheme the data bit stream 1001 is encoded with bits 110.

i. Determine the actual bit stream transmitted (5mks)
ii. Suppose that the data received is 101010, is there any error in transmission? Explain (5mks)