MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2013/2014

FIRST YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

(MAIN CAMPUS)

SCS 113: DATA COMMUNICATION

Date: 17th July 2014 *Time: .2.30 – 4.30 pm*

INSTRUCTIONS:

- Answer ALL questions in SECTION A and any other TWO from SECTION B.
- Write your registration number on all sheets of the answer book used.
- Use a NEW PAGE FOR EVERY QUESTION attempted, and indicate number on the space provided on the page of the answer sheet.
- Fasten together all loose answer sheet.
- No mobile phones and PDAs in the examination room.

Write down the letter that corresponds to your choice for correct answer

(i) Communication between a computer and keyboard involves ----------transmission.
A. Half duplex B Simplex C Duplex D Automatic

(ii) In a network with 15 computers, which topology would require extensive cabling?
A Star B Mesh C Bus D Ring

(iii) Frequency of failure and network recovery after failure are measures of the ----------of a network.
A performance B reliability C security D feasibility

(iv) Before data can be transmitted, they must be transformed to ----------
A. Periodic signals B electromagnetic signals
C aperiodic signals D low frequency sine-waves

(v) Signal modulation involves:
A changing the modulating signal by the carrier
B changing the carrier by the modulating signal
C quantizing the information signal
D sampling the data signal.

(vi) In Nyquist signal sampling theorem, the data sampling rate is----------
A at least half the highest data signal frequency
B at least twice the highest data frequency
C twice the lowest data signal frequency
D the same as the data frequency

(vii) Which of the following modulation schemes offers the highest transmission rate?
A. PSK B ASK C FSK D QAM

(viii) In an environment with many high voltage devices, the best transmission medium would be----------
A. Twisted pair-cable B Optical fibre C Coaxial cable D free space

(ix) Which multiplexing technique shifts data to a different frequency?

A. Wavelength division Multiplexing B Frequency division multiplexing
C Time division multiplexing D Phase division multiplexing

(x) Which of the following primarily uses guided media?
A Cellular phone system B Satellite communication
C Local telephone network D Radio broadcasting

QUESTION 2

(a) Describe the Ring and Star architectures / topologies in Data Networks. What are the advantages and disadvantages of one over the other?
8 marks

(b) (i) Name one of the International Standards Organization (ISO) bodies, and specify its
2marks

(ii) state, (at least four 4 reasons) why standards are necessary in communication systems?
4 marks

(c) Outline the roles of Communications Commission of Kenya (CCK)
6 marks

QUESTION 3

(a) Explain the difference between analog and digital data, and state four advantages and two disadvantages of using digital communication systems for data transfer.
8 marks

(b) Briefly explain the functional difference between:
(i) Simplex and duplex communication modes
(ii) Serial and parallel modes of data transfer
(iii)Synchronous and asynchronous transmitter / receiver
6 marks

(c) (i) Explain, using relevant sketches, the difference between periodic and aperiodic signals.
2 marks

(ii) An electromagnetic signal is represented by: $s(t) = 4 \sin 628t$, determine its peak amplitude, period, frequency and wavelength. Take velocity of light to be $3.0 \, x \, 10^8 m/s$
4 marks

QUESTION 4

(a) The following devices are synonymous with Data Communication:
MODEM, CODEC and Multiplexer / Demultiplexer (DMux)
Explain (NOT state!) the function(s) of each of these devices in data Communication system
8 marks

(b) (i) Explain why it is necessary to encode data before it is transmitted.

2 marks

(ii) Differentiate between Return to Zero (RZ) and Non Return to Zero (NRZ) encoding schemes.

2 marks

(iii) Draw the output waveforms representing the data: 11011101 when encoded, using NR, NRZ and Manchester encoding schemes.

8 marks

QUESTION 5

(a) (i) Explain the difference between guided and unguided transmission media.

2 marks

(ii) Outline the challenges, at least one in each case, of using guided and unguided transmission media.

2 marks

(iii) State (at least two) factors that should be considered while choosing the type of medium for use in (data) transmission.

2 marks

(b) (i) What is " signal modulation", and what are its essence in communication?

4 marks

(ii) Name four digital modulation schemes, and State the factors that should be considered when choosing a modulation scheme to use.

7 marks

(iii) Which modulation scheme is most recommended for data transmission and why?

3 marks

END!