



MASENO UNIVERSITY

**FIRST YEAR SECOND SEMESTER EXAMINATIONS FOR THE
DEGREE BACHELOR OF SCIENCE IN INFORMATION
TECHNOLOGY
(CITY CAMPUS - EVENING)**

CIT 113: DATA COMMUNICATIONS

Date: 3rd April, 2014

Time: 5.30 – 7.30 p.m.

INSTRUCTIONS:

- This paper contains two sections namely **SECTION A** and **SECTION B**.
- Attempt **ALL** questions in **SECTION A** and **ANY TWO** questions in **SECTION B**.
- Section A carries 30 marks and each question in Section B carries a total of 20 marks.



SECTION A

QUESTION ONE

- a. With the help of a diagram describe the following key elements of a typical data communications model: (10 Marks).
 - i. Source
 - ii. Transmitter
 - iii. Transmission system
 - iv. Receiver
 - v. Destination
- b. Distinguish the terms Data and Signal. (3 Marks).
- c. Distinguish the concepts of circuit switching and packet switching. (3 Marks).
- d. Using examples state and explain the following impairments that affect the information-carrying capacity of a communication link;
 - i. Attenuation and attenuation distortion. (2 Marks).
 - ii. Delay distortion. (2 Marks).
 - iii. Noise. (2 Marks).
- e. Clearly distinguish Synchronous and Asynchronous transmission in data communication systems. (4 Marks).
- f. Describe the criteria for choosing a communication media. (4 Marks).

QUESTION TWO

- a. Using appropriate examples describe the following main categories of noise.
 - i. Thermal noise. (3 Marks).
 - ii. Intermodulation noise. (3 Marks).
 - iii. Crosstalk. (3 Marks).
 - iv. Impulse noise. (3 Marks).
- b. Define the term media in data communication systems and describe the three major categories of media. (4 Marks).
- c. Explain the meaning of data encryption in regard to privacy in communication channels. (4 Marks).

QUESTION THREE

- a. Define the following terms related to transmission of data over a given communication path.
 - i. Channel capacity. (2 Marks).
 - ii. Data rate. (2 Marks).
 - iii. Bandwidth. (2 Marks).
 - iv. Noise. (2 Marks).
 - v. Error rate. (2 Marks).
- b. With the help of appropriate examples distinguish guided media from unguided media. (4 Marks).
- c. Give a physical description of the coaxial cable and state any four specific applications of the coaxial cable. (6 Marks).

QUESTION FOUR

- a. Discuss any five major strengths of optical fiber over twisted pair or coaxial cable. (10 Marks).
- b. The following Digital Signal Encoding techniques may be used in encoding digital data into a digital signal. Using a diagram show the encoded signal for each when a digital data (01001100011) is to be encoded using the techniques.
 - i. Nonreturn to Zero-Level (NRZ-L). (2 Marks).
 - ii. Nonreturn to Zero Inverted (NRZI). (2 Marks).
 - iii. Bipolar-AMI. (2 Marks).
 - iv. Pseudoternary. (2 Marks).
 - v. Manchester. (2 Marks).

QUESTION FIVE

- a. Using a diagram explain the following three basic encoding or modulation techniques for transforming digital (00110100010) data into analog signals.
 - i. Amplitude Shift Keying. (2 Marks).
 - ii. Binary Frequency Shift Keying. (2 Marks).
 - iii. Binary Phase Shift Keying. (2 Marks).
- b. Explain the two principal reasons for analog modulation of analog signals. (4 Marks).
- c. Differentiate the terms circuit switching and packet switching. (4 Marks).
- d. Communication via circuit switching involves three phases. Discuss the three phases; (6 Marks).