TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN TECHNOLOGY (INSTRUMENTATION AND CONTROL ENGINEERING)

ETI 2334: TELEMETRY AND NETWORKING II.

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2HOURS

DATE: DECEMBER 2016

<u>**Instructions to Candidates**</u>
1. You should have the following for this examination
    Answer Booklet
    Examination pass
    Student ID
    Electronic calculator
2. This paper consists of FIVE Questions.
3. Attempt ANY THREE questions.
4. All questions carry equal marks.
5. This paper consists of THREE printed pages.
Do not write on the question paper.

Question ONE

a. Define the following terms:
  (i)   Block code.
  (ii)   Code word.   **(2 marks)**
b. (i) State any **TWO** limitations of the error detection by use of parity bits method.

   (ii)The following data stream is to be transmitted over a channel. Generate the required longitudinal redundancy check bits to accompany the data to facilitate error detection at the receiver.

       10011010 11011010 11101101 10101101

  (iii)   Explain how the receiver will determine the error if the first data unit is corrupted by noise as follows.

c. State and explain the **TWO** types of errors. **(2 marks)**
d. For the data below, generate the hamming code word. Invert one bit and hence using the hamming code technique show how to identify the bit with the error. **(6 marks)**

       1101100111011

Question TWO

(a) Explain the following terms as used in networking giving an example of each:
    (i)   Network topology.
    (ii)   Network protocols. **(4 marks)**
(b) Describe the Bus topology and explain how communication is achieved on the Bus .
                            (6 marks)
(c) With the aid of diagrams describe the following types of topologies as used in networking:
    (i)   Ring
    (ii)   Star **(6 marks)**
(d) Describe the following layers of the OSI model:
    (i)   Physical layer.
    (ii)   Data link layer. **(4 marks)**

Question THREE

(a) Explain the **THREE** phases that are involved for communication to occur via Circuit Switching. **(6 marks)**
(b) State and describe the functions of a protocol at:
    (i) Sending computer.
    (ii) Receiving computer. **(4 marks)**

(c) Describe the peer to peer network access method highlighting the advantages and disadvantages of using this type of network access. **(8 marks)**
(d) Differentiate between internet and intranet. **(2 marks)**

Question FOUR

a. With the aid of a basic layout diagram of A Supervisory Control and Data Admission system, describe the **FIVE** major components of SCADA.
                            (12 marks)

b. Outline at least **TWO** characteristics of each of the following Telemetry Networking Bus Protocols.

    (i)   Mod Bus.

    (ii)   Profit Bus.

    (iii)   Can Bus.

    (iv)   HART.   **(8 marks)**

Question FIVE

a. (i) Define the term Network.   **(2 marks)**

    (ii) State and explain **TWO** main characteristics of networking.   **(4 marks)**

    (iii) Describe **FOUR** reasons of creating a network.   **(4 marks)**

    (e) State FOUR factors to be considered when choosing the type of network to be implemented.   **(4 marks)**

b.   Define the following terms in relation to modulation:

    i.   Pulse Code Modulation.

    ii. Differential Pulse Code Modulation.

    iii. Delta Modulation.   **(6 marks)**