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:SEPT. 2017

Instructions to Candidates

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) Describe the architecture of SCADA based on:
   (i) Hardware.
   (ii) Software. **(4 marks)**

(b) Briefly explain the advantages of SCADA in the following aspects:
   (i) Scalability.
   (ii) Access to Data.
   (iii) Database Management.
   (iv) Network Capabilities. **(8 marks)**

(c) State and briefly describe THREE protocols that are specialized to SCADA. **(6 marks)**

(d) Mention TWO technologies that are competing with SCADA in industrial automation. **(2 marks)**

Question TWO

a. (i) State any **TWO** advantages of switching.
(ii) Highlight any **TWO** differences between circuit switched and Virtual circuit switching.
(ii) With the aid of sketches describe the datagram approach to packet switching.
(7 marks)

b. Explain any **TWO** functions of each of the following OSI layers.
(i) Application layer.
(ii) Network.
(iii) Data link.
(iv) Physical layer. **(8 marks)**

c. Explain the **THREE** phases that are involved for communication to occur via Circuit Switching. **(5 marks)**

Question THREE

(a) Define the term computer network and highlight the Components of a network. **(3 marks)**
(b) Describe the characteristics of the following types of networks:
(i) LAN.
(ii) Internet. **(6 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. **(3 marks)**

Question FOUR

(a) (i) Distinguish between Parity check and Hamming Code as employed in error detection.
(ii)Briefly describe:
(I) Token.
(II) Packet switching.
(III) Polling. **(9 marks)**

(b) (i) Briefly explain the Cyclic Redundancy Check as employed in error detection.
(ii)The data unit 1100011101 is to be transmitted.
(I) Perform a Cyclic Redundancy Check on the data unit to generate the CRC-CODE (Take G-11001)
(II) State the message code transmitted.
(III) Briefly describe how the receiver will check the transmitted message for errors.
(IV) Draw a sketch showing the implementation of (b)(ii)(I) above using shift registers.
(11 marks)

Question FIVE

a. Distinguish between WAN and LAN. **(2 marks)**

b. In reference to data transmission define the following terms:
   (i) Base band transmission.
   (ii) Broad band transmission.
   (iii) PAM.
   (iv) PWM.
   (v) PPM **(10 marks)**

a. 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)**