TECHNICAL UNVERSITY OF MOMBASA

Faculty of Engineering & Technology in Conjunction with Kenya Institute of Highways and Building Technology (KIHBT)

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

HIGHER DIPLOMA IN ELECTRICAL & ELECTRONIC ENGINEERING

EEE 3258: TELEMETRY & NETWORKING II

END OF SEMESTER EXAMINATION
SERIES: AUGUST 2014
TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*
- *A non-programmable Scientific Calculator*

This paper consists of **FOUR** questions. Answer any **THREE** questions
All questions carry equal marks
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

Question One

a) (i) Briefly describe intersymbol interference.

(ii) State TWO methods used in reducing the effects of intersymbol interference. **(3 marks)**

b) (i) Distinguish between Pulse Amplitude Modulation (PAM) and Pulse Time Modulation (PTM) Systems
(ii) By employing a comparator derive the expression for a PAM signal.
(iii) Draw a block diagram of Pulse Code Modulation (PCM) and state the function of each block. **(10 marks)**

c) During the process of pulse code modulation a10 bit sampler produced a binary 1011101 for an input analogue signal of 2.250V. Determine:
(i) The maximum allowable input voltage to the sampler
(ii) The resolution of the sampler **(7 marks)**

Question Two

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

b) Briefly explain the advantages of SCAD in the following aspects:
(i) Scalability
(ii) Access to Data
(iii) Database Management
(iv) Networking 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 Three

a) Explain the following terms as applied in networking give an example of each:
(i) Network Topology
(ii) Network protocols **(4 marks)**

b) With the aid of diagrams, describe the following network topologies:
(i) Bus
(ii) Star
(iii) Ring **(6 marks)**

c) (i) Distinguish between a nub and a switch.

(ii) State and explain the operation of any TWO network access methods.

(iii) Distinguish between contention and collision in data transmission. **(10 marks)**

Question Four

a) Explain the function of the following layers in a network:
- **(i)** Session layer
- **(ii)** Network layer
- **(iii)** Physical layer **(6 marks)**

b) (i) With the aid of sketch, describe datagram approach to packet switching.
(ii) Distinguish between circuit and packet switching
(iii) Describe the peer to peer network. **(14 marks)**

Question Five

a) Explain the following terms:
- **(i)** Source coding
- **(ii)** Channel coding **(4 marks)**

b) (i) 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. Use even parity.
11100111 11011101 10111001 00101001

(ii) State TWO disadvantages of vertical redundancy check. **(4 marks)**

c) Perform cyclic redundancy extended data unit received and state whether the data is intact or corrupted.
10110011

Assume the polynomial (divisor) used at the transmitter 1001 **(4 marks)**

d) The following (16, 11) block check code (BCC) is received. Determine by using Hamming code technique the but position which is in error and make the necessary corrections.
0010110011110111 **(6 marks)**