EASTERN UNIVERSITY, SRILANKA
DEPARTMENT OF MATHEMATICS
THIRD EXAMINATION IN SCIENCE – 2008/2009
SECOND SEMESTER (Sep./Nov., 2010)

CS 302 – COMPUTER NETWORK
(Proper & Repeat)

Answer all questions   **Time allowed: 2 Hours**

1)
  a. Describe the usage of computer network in the government sector in Sri Lanka. Give an example for such network.

  b. List the advantages and disadvantages between the wired and wireless transmission media

  c. Compare and contrast the connection oriented and connectionless services.

  d. Describe each of the following switching techniques:
     i.   Message switching;
     ii. Packet switching.

2)
  a. Describe the following modulation techniques:
     i).   Amplitude Modulation (AM);
     ii). Frequency Modulation (FM).

  b. Suppose a series of 10 bit message blocks (frames) are to be transmitted across a data link using a CRC for error detection and correction.

  Assume the generator polynomial is $G(x) = x^4 + x + 1$, and the receiver receives the data frame as **110101101110011**.

     i).   Find out the message that the sender trying to send.

     ii). Find the CRC code produced by the sender.

     iii). Comment on the data link or transmission media that the sender and receiver are connected. Justify your comments.

3)

a) The data link layer is responsible for the final encapsulation of higher-level messages into frames that are sent over the network at the physical layer. It uses several methods to handle the framing such as Character Count, Byte Stuffing and Bit Stuffing.

Consider a data link layer that uses the following character encoding:

A: 01000111; **B:** 11100011; **FLAG:** 01111110; **ESC:** 11100000

Show the bit sequence transmitted (in binary) for the following frames when *Byte Stuffing* and *Bit Stuffing* framing methods are used:

i). A B ESC FLAG B

ii). A ESC FLAG B ESC ESC FLAG A

b) "When the (transmitting nodes / available nodes) ratio in a network is kept low, the Time Division Multiplexing (TDM) yields less efficiency". Discuss the validity of the above statement.

c) Describe how CSMA and CSMA/CD handles the data collision in a network.

4)

a) Compare and contrast 'Go-back-N' and 'Selective Repeat' protocols.

b) Two neighboring nodes (**A** and **B**) use a sliding-window protocol with a 3-bit sequence number. As the ARQ (Automatic Repeat Request) mechanism, *Selective Repeat ARQ* is used. Assuming **A** is transmitting and **B** is receiving, show the window positions for the following succession of events at each node:

i). Before **A** send any frames.

ii). After **A** sent frames 0, 1, 2 and **B** acknowledged 0, 1 and the ACKs (acknowledgements) are received *by* **A**.

iii). After **A** sent frames 3, 4 and 5 and **B** acknowledged 4 and the ACK is received by **A**.