EASTERN UNIVERSITY, SRI LANKA

THIRD YEAR SECOND SEMESTER EXAMINATION IN SCIENCE – 2010/2011

(MARCH, 2014)

CS 302 – COMPUTER NETWORKS

(SPECIAL REPEAT)

Answer all questions   Time: 2 Hours

1)
   a) List five usages of *computer networks* in your day-to-day activities.

   b) Define g*uided media* and *unguided media.* List three examples for each of them.

   c) Write short notes on the following:

      i.   *Local Area Network*;

      ii.   *Wide Area Network.*

   d) What do you understand by *Routing* in the field of data communication?

   e) Compare *circuit switching* and *message switching* techniques.

2)
   a) Briefly describe the functions of *Data link layer*, *Network layer* and *Session layer* of OSI reference model.

   b) Briefly describe the process of data transmission through the layers of OSI reference model.

   c) What do you understand by *framing* in terms of data transmission in computer networks?

   d) An eight character data frame `A B ESC ESC A C FLAG FLAG` needs to be transmitted at data link layer. Assume the following character encoding were used in data link layer protocol: `A:01000111`, `B:11100011`, `C:11100010`, `ESC:11100000` and `FLAG:01111110`.

      Find the bit sequence transmitted if the following framing methods are used:

      i.   Flag bytes with byte stuffing;

      ii.   Starting and ending flag bytes, with bit stuffing.

3)

a) Briefly describe the following analog modulation techniques:

    i.   Amplitude Modulation (AM);

    ii.   Frequency Modulation (FM).

b) Given the following digital data: **110100011011**. Assuming this binary data is been transmitted across a communication channel, draw the modulated signal if the communication system uses the following digital modulation techniques:

    i.   ASK;

    ii.   FSK;

    iii.   2-PSK;

    iv.   4-PSK.

c) Explain briefly the different types of *multiplexing* techniques.

d) Compare and contrast the *TCP* and *UDP*.

4)

a) What do you understand by *piggybacking* in data transmission?

b) Analyse the transmission of a data packets for a system that uses *Stop and Wait protocol* for the following situations: (Use appropriate figures to support your answer.)

    i.   Normal operation;

    ii.   Lost or damaged frame;

    iii.   Lost acknowledgement;

    iv.   Delayed acknowledgement.

c) One of the most popular methods of error detection for digital signals is the Cyclic Redundancy Check (CRC).

    i.   Suppose a short message **1010101101** to be sent across a data link using the CRC with the generator polynomial $G(x) = x^3 + x + 1$. Find the CRC code appended with the message.

    ii.   If the receiver receives the data as **1010101101111**, comment on the reliability of the communication link.