# Daffodil International University

**Department of Computer Science and Engineering**
**Faculty of Science & Information Technology**
**Final Examination Semester: Summer 2019**
**Course Code: CSE 233 (Day) Course Title: Data Communication**

**Time: 2.0 hours** **Full Marks: 40**

**Part A: Answer the following questions briefly.** **5*2=10**

a. What are the properties of a transparent switch?
b. Differentiate between pure aloha and slotted aloha.
c. Which of the three multiplexing techniques is common for fiber optic links? Explain the reason.
d. Draw the flow diagram of CSMA/CD.
e. Transport plays an important role in the OSI reference model. List the functionalities of this layer.

**Part B: Answer *ALL* Questions** **10*3=30**

1. a) The following divisor and dividend are given. Find out the CRC and also check whether the given dataset has error or not. 6

   Divisor (x) = $x^3 + x^2 + 1$
   Dividend (x) = $x^6 + x^4 + x^2 + x$

   b) What is the hamming distance for each of the following codewords? 2

   d (101100, 000001) d (11001, 11000)
   d (00110, 11111) d (01110, 00000)

   c) Checksum is widely used as part of the IP protocol. Why do you think Checksum might have been selected rather than the other two error detection techniques? 2

2. a) Define Analog hierarchy used by telephone companies and list different level of hierarchy. Also find the overhead (extra bandwidth for guard band or control) in each hierarchy level. 4

   b) Alice and Bob are experimenting with CSMA using a W1 Walsh table. Alice uses the code [+1] and Bob uses the code [−1]. Assume that they simultaneously send a binary digit to each other. Alice sends $(6)_{16}$ and Bob sends $(B)_{16}$. Show how they can detect what the other person has sent. 4

   c) Explain the flow diagram of at least two persistence methods used in CSMA. 2

3. a) A telephone line passes signals between 300 Hz and 3400 Hz. The signal to noise ratio (SNR) is 30dB. Use appropriate formula to find the maximum theoretical capacity of this line using Shannon capacity, Nyquist Bit rate and $SNR_{dB}$. 3

b) As signal is transmitted through a channel, undesired signal in the form of noise gets mixed up with the signal. Now categorize the various kinds of noise and mention the remedy of each kind. 3

c) Show the contents of the five output frames for a synchronous TDM multiplexer that combines five sources sending the following characters. Note that the characters are sent in the same order that they are typed. The third source is silent. 4

Source 1 message: SAH
Source 2 message: SMTS
Source 3 message:
Source 4 message: FF
Source 5 message: ASMFH