



Daffodil International University

**Department of Computer Science and
Engineering Faculty of Science & Information
Technology**

Final Assessment, Spring 2021 @ DIU Blended Learning Center

Course Code: CSE225/233, Course Title: Data Communication

Instructor: Md Assaduzzaman

Date: 20 April, 2021 Time: 11:00 am - 03:00 pm

Four hours (4:00) to support online open/case study based assessment

1. (a) Show the contents of the six output frames for a synchronous TDM multi-plexer that combines five sources sending the following characters. Note that the characters are sent in the same order that they are typed. The fourth source is silent.

- a. Source 1 message: CORONA
- b. Source 2 message: WEAR
- c. Source 3 message: MASK
- d. Source 4 message:
- e. Source 5 message: END

2.(a) What is the Hamming distance for each of the following codewords?

d (10000, 00000) , d (10101, 10000)

d (00000, 11111) , d (00000, 00000)

(b) Assuming even parity, find the parity bit for each of the following data units.

a. 1001011 b. 0001100 c. 1000000 d. 1110111

(c) Write the divisor in polynomial form where, divisor = binary value that equals to last part of your student ID digit (decimal) (e.g 4339)

3. Suppose you want to send a polynomial equation to your friend. You want to use Cyclic Redundancy Code (CRC) for error detection. Here, divisor : x^4+x^2+x+1 and Dataword $X^7+X^4+X^3+X+1$

a. Show the generation of the codeword at the sender site

b. Show the checking of the codeword at the receiver site (assume no error)

4. (a) A pure ALOHA network transmits X-bit per frames on a shared channel of 200 kbps. What is throughput if the system(all station together) produces,[Here, $X=400+\text{last 2 digit of your ID}$] [e.g 4339, so, $X=400+39=439$]

a) 1000 frames per second

b) 500 frames per second

(b). Sima is the administrative officer , and Ripon is the accounts officer of DIU. Sima needs to send the five data items 6, 7, 3, 1 and 9 to Ripon. Now considering the five data items, answer the following:

a. Find the checksum(complimentary) at Sima's site.

b. Find the checksum(complimentary) at Ripon's site if there is no error.

5. CDMA is based on coding theory. Each station is assigned a code, which is a sequence of numbers called chips, as shown in the following figure.



We assume that stations 1 and 2 are sending a 0 bit and channel 4 is sending a 1 bit. Station 3 is silent. We follow the following rules for encoding: If a station needs to send a 0 bit, it encodes it as -1, if it needs to send a 1 bit, it encodes it as +1. When a station is idle, it sends no signal, which is interpreted as a 0.

Suppose, stations 3 and 2 are talking to each other. Station 3 wants to hear what station 2 is saying. Explain full process of CDMA and find out the data from station 2

