Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Midterm Exam Examination, Summer 2021 @ DIU Blended Learning Center

Course Code: CSE225 (Day), Course Title: Data Communication

Level: 2 Term: 2 Section: ALL

Marks: 25, Modality: Open Book Exam

Date: Sunday, July 4, 2021. Time: 01:30pm-04:00pm

Two hours and thirty minutes (2:30) to support online open/case study-based assessment

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Directions:

- **Students need to go through the CASE STUDY shown in this exam paper.**
- **Analyze and answer specific section based on your own thinking and work.**
- **Do not share as this will be treated as plagiarism by Blended Learning Center.**

Question 1: **1+2+3**

We already know that in any network transmission model, any two devices will start communication by the virtue of their unique address. In simple words, we can say that if any two devices want to engage in any kind of communication, then they should first identify themselves in this complex network transmission arena. So first they should know each other's respective addresses (of source and destination). On the internet employing TCP/IP protocol, we have four levels of addresses being in use for different layers. They are Physical address, Logical address (IP), Port address and Specific address.

Now answer the following questions:

a) What is the difference between physical and logical address?
b) How the physical address is used to send data from host to destination. Explain with proper figure.
c) Why the physical addresses change from hop to hop, but the logical addresses remain the same. Explain with proper figure.

Question 2: **3+2**

a. Analog signals move via transmission media in a communication system, which degrades the signal's quality. Therefore, the signal at the start of the medium does not match the signal at the end of the medium. I mean what is sent by the source is not accurately received by the destination. Explain the causes of this imperfection.

b. What is the theoretical capacity of a channel in each of the following cases?

I. Bandwidth: 8 MHz SNR_{dB} = (last 2 digit of your id) [If 00, use 89]
II. Bandwidth: 48 KHz SNR_{dB} = (last 2 digit of your id) [If 00, use 45]

Question 3: **1*5 =5**

Line coding is the process of converting digital data to digital signals. We assume that data, in the form of text, numbers, graphical images, audio, or video, are stored in computer memory as sequences of bits. This line coding converts a sequence of bits to a digital signal. There is several line coding schemes. Convert the last 2 digit of your student ID into the following line coding schemes.

a) NRZ (I)
b) MLT3
c) PSEUDOTERNARY
d) RZ
e) Differential Manchester

[Suppose the ID of one student is: 193-15-1079. The last two digits are 79. Convert these 7 and 9 into binary using 4 bits for each of them. So, 7 will be 0111 and 9 will be 1001. So, your data is 01111001.]

Question 4: **1+1+1.5+1.5**

Suppose there is an administrator that has four departments to manage. The sales and purchase department with 140 computers, the development department with 50 computers, accounts department with 26 computers and management department with 25 computers. Referring to the mentioned scenario, answer the following questions.

a) What type of topology is best suited to serve your desire?
b) Mention why you choose this topology?
c) What are the possible limitations of the topology you have chosen?
d) Draw the conceptual diagram of the scenario described above by using your chosen topology.

Question 5: **0.5*8=4**

Match the following to one or more layers of the TCP/IP protocol suite:

a) route determination
b) connection to transmission media
c) providing services for the end user
d) creating user datagrams
e) responsibility for handling frames between adjacent nodes
f) transforming bits to electromagnetic signals
g) Log-in and log-out procedures
h) Provides independence from differences in data representation