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Daffodil International University

Quiz_3

Department of Computer Science and Engineering (CSE)

Daffodil International University

Student's ID: [redacted] Program: CSE Semester: Spring 2025 Year: 2025

Course Code: CSE 225 Course Title: Data Communication Section: 65_C Date: 10-4-2025

Class Test No: 03 Signature of the Course Teacher: ..... Set: C

Answer any one of the following questions.

Question 1

(6+6+3) = 15 Marks

a. The practice of multiplexing signals from lower-bandwidth lines to higher-bandwidth lines has long been used by telephone companies to increase the efficiency of their infrastructure. Many switched or leased lines can be joined in this fashion into fewer but larger channels. Therefore, analyze the ***analog hierarchy of a telephone company with proper flow diagram.*** Besides, find out the bandwidth and guard band for each level.

b. Assume that a voice channel occupies a bandwidth of 5 kHz. We need to combine four voice channels into a link with a bandwidth of 20 kHz, from 20 to 40 kHz. Show the configuration, using the frequency domain. Assume there are no guard bands.

c. Let us consider ***Three (3)*** inputs of **20 kbps** and ***Three (3)*** inputs of **60 kbps** are applying to multilevel multiplexing techniques of data rate management. Draw the diagram of multilevel multiplexing strategy and find out the output values in kbps.

Question 2

(6+6+3) = 15 Marks

a. Show the contents of the 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.
Source 1 message: "Your First name"
Source 2 message: "Your middle name" (if middle name missing, then empty the source)
Source 3 message: "Your Last name"
Source 4 message: "Your Father's First name"
Source 5 message: "Your Mother's First name"
Source 6 message: "Your Best friend's name"
(Ex; Your name is Sayna Akhter, Source 1 message: Sayna)

b. Suppose you have the following bits to send (in decimal): 5, 12, 14, 7, and 2. Inspect the checksum.

c. Calculate the hamming distance for each of the following codewords. Also, identify the minimum hamming distance.
i) d (110101, 001000)
ii) d (110101, 100101)
iii) d (000110, 111111)
iv) d (011010, 111100)

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Prepared by Professor Dr Md Fokhray Hossain
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