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Daffodil International University

Faculty of Science & Information Technology
Department of Information Technology & Management (ITM)
Final Examination, Summer 2026
Course Code: ITM 315, Course Title: Data Communication and Networking
Section: A (10th Batch), Teacher: BCD

Time: 2:00 Hrs **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1	*a)*	Suppose you want to send a message to your friend using the complementary checksum. Your message consists of the decimal values 7, 12, 9, 13, 15. You generate the packet by applying the complementary checksum and send it. Your friend receives the packet and checks it to verify whether the transmission is error-free or an error has occurred. **Justify** whether the transmission contains any error or not.	4	**CLO3** Level -3
	b)	**Compare** the Poll and Select functions in controlled access protocol with figure. Generate the combined signal for four stations using **Walsh** table if the bits for the stations are 1, 0, silence, and 1 respectively.	4+4=8	
2	*a)*	**Determine** are the propagation time and the transmission time for a 3.5 kbyte message (an email) if the bandwidth of the network is 1 Gbps? Assume that the distance between the sender and the receiver is 15,000 km and that light travels at 2.4×10^8 m/s.	3+3=6	**CLO3** Level -5
	b)	Five channels, each with a 150-kHz bandwidth, are to be multiplexed together. Determine the minimum bandwidth of the link if there is a need for a guard band of 20 kHz between the channels to prevent interference?	4	
3	*a)*	**Illustrate** the shift keying in digital-to-analog conversion? Draw the analog hierarchy of telephone communication systems using Frequency Division Multiplexing (FDM).	2+4=6	
	b)	An analog signal has a bit rate of 8000 bps and a baud rate of 1000 baud. **Evaluate** the number of data elements that are carried by each signal element and calculate the number of signal elements we need?	4	**CLO4** Level -5
4	*a)*	**List** the components of pulse code modulation? Briefly describe Delta modulation technique.	1+3=4	**CLO4** Level -1
	b)	An available bandwidth of 150 kHz, extending from 600 kHz to 750 kHz, is allocated for data transmission. **Identify** the carrier frequency and the achievable bit rate when ASK is used with a modulation index d=1	4	