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Daffodil International University

Faculty of Science & Information Technology

Department of Software Engineering

Final Examination, Fall 2025

Course Code: SE-225

Course Title: Data Communication & Computer Networking

Sections & Teachers: AMR(A,B), KBB(C,D), FT(E,F), FC(G,H), MNA(I), RT(J,L), NBA(K), MSP(M,N)

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.]

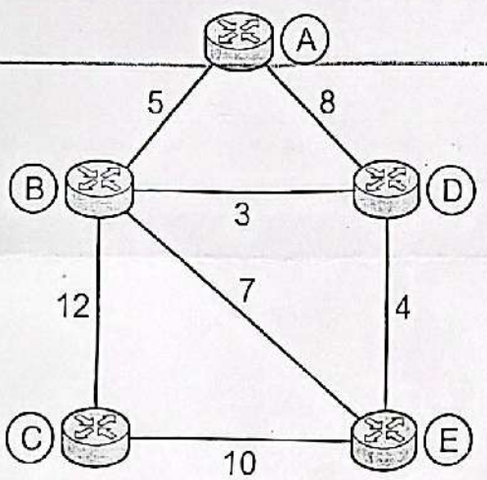
1.	*a)*	**Examine** the differences between TCP and UDP with respect to reliability, connection type, and common use cases.	[Marks-2]	CLO-1 *Level-3*
	b)	**Illustrate** the HTTP request–response cycle.	[Marks-3]	
2.	You are working on an upgraded file transmission system where data is transmitted in 6-bit chunks. As before, the system uses Hamming Distance to evaluate error detection/correction capability and Cyclic Redundancy Check (CRC) for error detection over the concatenated data. The file is divided into the following 6-bit data chunks: • Chunk 1: 101011 • Chunk 2: 110010 • Chunk 3: 011001 • Chunk 4: 111100			CLO-3 *Level-3*
	a)	**Apply** your knowledge on Hamming Distance to calculate: • The maximum number of bit errors that can always be detected by a block code • The maximum number of bit errors that can be corrected by such a code.	[Marks-4]	
	b)	**Derive** the CRC generator polynomial (in binary) according to: $x^2 + 1$	[Marks-1]	
	c)	The data to be transmitted is formed by binary addition of Chunk 1 & Chunk 4. Data = Chunk 1 + Chunk 4 Using the generator polynomial obtained in part (b), **Calculate** the CRC bits for this data.	[Marks-5]	
3.	You are designing an IPv4 addressing plan for a medium-sized office network. Your ISP has allocated the address block:			CLO-4 *Level-4*

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11000000.10101000.00101000.00000000/26

This block will be used to create multiple subnets for different departments.

	a)	**Transform** the given IP address into its decimal representation.	**[Marks-2]**
	b)	**Identify** the appropriate subnet mask.	**[Marks-3]**
	c)	**Examine** each subnet and identify the network ID, broadcast IP, and range of usable host IP addresses for every subnet.	**[Marks-8]**
	d)	**Investigate** whether 192.168.40.70 is a valid host IP address; if it is valid, identify the subnet to which it belongs.	**[Marks-2]**
	e)	**Analyze** the purpose of CIDR (Classless Inter-Domain Routing) in IPv4 networking, focusing on how it helps conserve address space and reduce routing table size.	**[Marks-3]**
4.	A Weighted Network Graph is given below:		



CLO-4
Level-4

	a)	**Identify** the initial routing table for each node in the network. Trace the Distance Vector algorithm to figure out the updated routing tables for Node C and Node E.	**[Marks-7]**