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Daffodil International University
Faculty of Science & Information Technology
Department of Software Engineering
Final Examination, Spring 2026
Course Code: SE-225
Course Title: Data Communication & Computer Networking
Sections & Teachers: KBB (A) , RT (B, C, J), AMR (D, E, F), MH (G, H), HBM (I)
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 Classful and Classless Addressing.	**[Marks-2]**	**CLO-1** *Level-3*
	b)	**Illustrate** the HTTP request–response cycle.	**[Marks-3]**	
2	You are the lead network engineer for a new deep-space satellite communication relay. The satellite transmits telemetry data, operational commands, and image packets back to the Earth station. Because cosmic radiation frequently causes bit-flips during transmission, your team has decided to implement different error detection and correction schemes for different types of data payloads based on their priority and processing constraints.			**CLO-3** *Level-3*
	a)	Suppose, the Parity Coverage Rules are; P1 ------> D3 D5 D7 P2 ------> D3 D6 D7 P4 ------> D5 D6 D7 Now, If the satellite uses an Even-Parity Hamming Code for error correction. **Compute** the final transmitted codeword for the 4-bit command **1010**.	**[Marks-4]**	
	b)	If the satellite system uses a Cyclic Redundancy Check (CRC) to detect burst errors in image payloads. Given the generator polynomial $x^3 + x^2 + 1$, **apply** your knowledge on CRC to find the final transmitted frame for the data message **1001**.	**[Marks-4]**	
	c)	A satellite system uses a standard Internet Checksum for routine telemetry data. Given the two 8-bit data blocks **10101010** and **11001100**, **derive** the final 8-bit checksum to be transmitted. Show all calculation steps.	**[Marks-4]**	
3.	*a)*	**Identify** the subnet mask, network address, broadcast address, and range of valid host addresses of the IP address 136.112.17.23.	**[Marks-4]**	**CLO-4** *Level-4*
	You are designing an IPv4 addressing plan for a medium-sized office network. Your ISP has allocated the address block:			

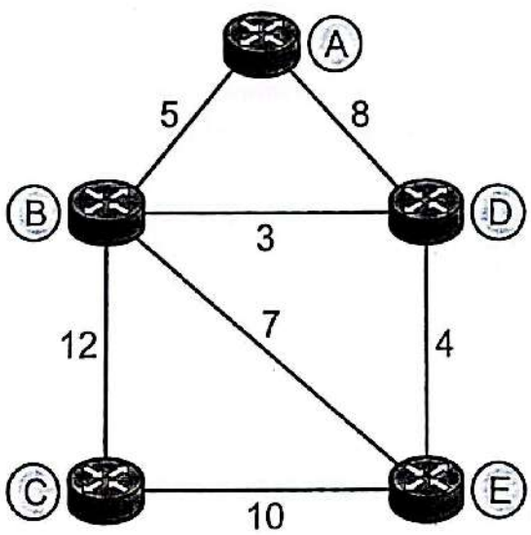
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11000101.10100000.00101000.00000000/27

Based on this scenario, answer question **b, c & d.**

b)	**Transform** the given IP address into its decimal representation and identify the subnet mask.	**[Marks-2]**
c)	**Examine** each subnet and identify the network ID, broadcast IP, and range of usable host IP addresses for every subnet.	**[Marks-7]**
d)	Suppose a corporate office needs to design its internal network. The office has been allocated a single IP network block and must divide it efficiently among its departments. The organization consists of the following departments with their respective number of devices: • HR Department: 18 devices • Finance Department: 26 devices • IT Support Department: 64 devices • All department are connected with each other via wan link **Identify** subnet masks and CIDR for each department.	**[Marks-5]**

A Weighted Network Graph is given below:



CLO-4
Level-4

Based on this scenario, answer question **e.**

e)	**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 B, Node D.	**[Marks-5]**