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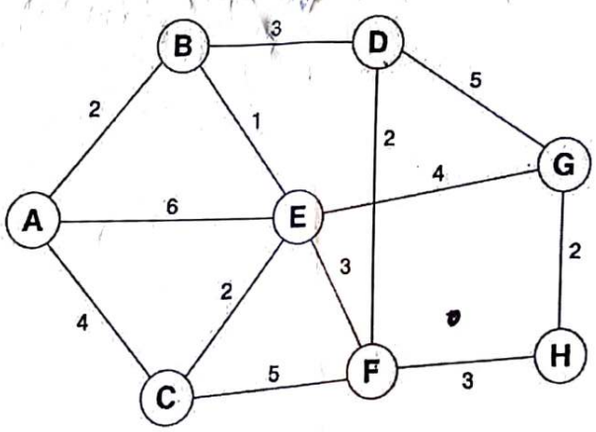
Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Midterm Examination, Summer 2026
Course Code: CSE321, Course Title: Computer Networks
Level: 3 Term: 1 Batch: 66

Time: 01:30 Hrs **Marks: 25**

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 computer lab has 20 computers connected through an intranet using a networking device. When a computer sends data, the device forwards the message only to the intended destination by using the destination computer's MAC address, thereby reducing unnecessary network traffic. Identify the networking device and explain its role in the network. Also, state the advantage and disadvantage of using this device.	[3]	CO1
2		A local ISP wants to connect eight small office networks named A, B, C, D, E, F, G, and H. The network uses a Link-State Routing protocol to calculate optimal routes between networks. Determine the shortest path and the corresponding path cost from network A to all other networks, step-by-step execution using a tabular format.  	[3]	CO3
3.		A student arrives on campus and connects their mobile phone to the university Wi-Fi network. To communicate on the network and access internet services, the phone must automatically obtain a valid IP address and other network configuration information from the campus network. The campus network includes a server that assigns IP addresses and other network settings to newly connected devices. Identify the protocol used for this process and explain its working mechanism. Illustrate the message exchange between the mobile phone and the server using a labeled diagram, and discuss advantage and disadvantage of using this protocol.	[4]	CO2

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4		Suppose you are the network administrator of a company and are assigned the network address 130.0.0.0/16. You need to configure the company's network and allocate address spaces using /28 subnet masks for different departments. • Determine the default subnet mask associated with the given network address. • Calculate the custom subnet mask represented by the prefix /28. • Determine the network address, first usable host address, last usable host address, and broadcast address of the 127th subnet. • Calculate the number of usable hosts addresses available in each subnet.	[5]	CO3
5.	a)	The network diagram below represents a technology incubator consisting of five LANs and three point-to-point router links. The organization has been assigned the address block 10.60.8.0/22. Apply VLSM subnetting techniques to design an efficient IP addressing scheme that minimizes address waste. Calculate the subnet allocation for each LAN and point-to-point link, and determine the network address, subnet mask, usable host range, and broadcast address for each subnet.	[7]	CO3
	b)	The given diagram shows a university network. The Core Router R1 is connected to two routers: R2 and R3. Four academic building networks are connected behind R2, while one nearby department network is connected behind R3. Determine the most suitable summary route that Router R2 should advertise to Router R1 for the four academic building networks. Also determine whether the summary route includes the nearby department network 172.16.52.0/24 or not. Show the necessary binary calculation.	[3]	CO3

