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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Midterm Examination, Fall 2026
Course Code: CSE321, Course Title: Computer Networks
Level: 3 Term: 1 Batch: 67

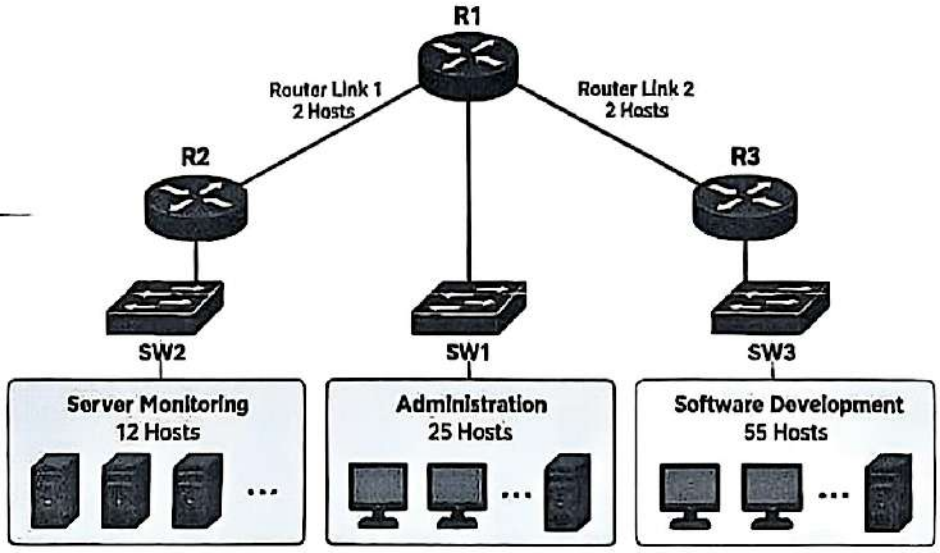
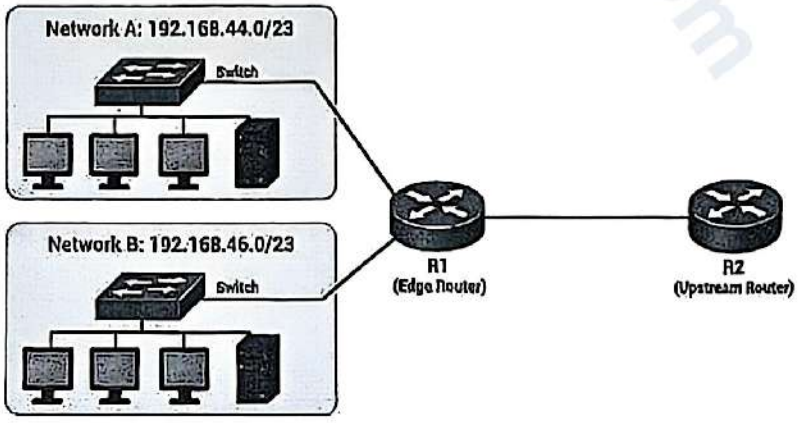
Time: 01:30 Hrs **Marks: 25**

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 university has two computer labs connected to separate IP networks. Lab A uses a hub, causing unnecessary traffic when multiple computers communicate. The university wants to improve communication within Lab A and enable data exchange between the two labs. Apply your networking knowledge to recommend the appropriate devices for addressing both requirements. Explain how your proposed devices would improve communication within and between the labs.	[3]	CO1
2		A commercial bank operates a nationwide network connecting its branches, ATMs, and central data center. During a recent link failure, several branches experienced prolonged connectivity loss, disrupting ATM transactions. The bank plans to upgrade its routing system using equipment from multiple manufacturers and subnets of varying sizes. The new system must automatically update routing information when network changes occur and quickly establish alternative routes during link failures. Analyze the network requirements and recommend the most suitable routing protocol among Static, RIPv1, RIPv2, OSPF, and EIGRP. Justify your recommendation by comparing its suitability with the alternatives.	[3]	CO3
3		Students at Daffodil International University (DIU) report that they cannot access the DIU Blended Learning Center (BLC) using its web address, although the platform is accessible when its IP address is entered directly. Other websites and email services are functioning normally. Demonstrate your understanding of application layer protocols by identifying the most likely service causing the problem, explaining its role in accessing DIU BLC, and suggesting two appropriate troubleshooting steps.	[4]	CO2
4		In a university computer lab, a laptop configured with IP address 192.168.10.78/27 cannot communicate with a network printer configured with IP address 192.168.10.110/27, although both devices are connected to the same switch and no router is present. • Calculate the subnet mask, usable host capacity, network address, broadcast address, and usable host range for each device. • Analyze the given network configuration and explain why the two devices cannot communicate. • Propose a suitable solution that would enable communication between the two devices while retaining the existing prefix length. Assume any address you propose is available.	[5]	CO3

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5	*a)*	A growing technology company has been assigned the IPv4 address block 172.16.40.0/24. The first 128 addresses are already allocated and must remain unchanged. The company plans to expand its network with three departments and two point-to-point router links, as shown in the network diagram below. Apply VLSM to design an efficient IP addressing scheme using only the remaining address space. For each LAN and router link, determine the network address, subnet mask, first and last usable host addresses, and broadcast address, ensuring sufficient host capacity and no overlapping subnets. 	[7]	CO3
	b)	A technology company operates the network 192.168.44.0/23. After acquiring another company, it takes control of an additional network, 192.168.46.0/23. The network administrator wants to advertise both networks using a single supernet to reduce routing table entries. Analyze whether the two networks can be combined into one exact supernet without including any additional addresses. Determine the resulting network prefix and justify your conclusion using binary calculations. 	[3]	CO3