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Daffodil International University

Faculty of Science & Information Technology
Department of Computing and Information System
Final Examination, Spring-2025
Course Code: CIS 211, Course Title: Computer Networks
Level:2 Term:2

Exam Duration: 2 Hours **Marks: 40**

Answer ALL Questions [Optional]

[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 company has been allocated the IP block **192.168.0.0/24**. The company has three groups with the following requirements- **Group 1**: 60 devices, **Group 2**: 29 devices, **Group 3**: 11 devices. Answer the following questions:			**CO3**
	a)	Determine the optimal subnet mask for each group to avoid wasting IP addresses.	3	
	b)	What would be each group's Network Address, Broadcast Address, and Valid user IP address range of the company?	5	
2.	A company is optimizing its service to deliver both live broadcasts and on-demand videos to users worldwide. To ensure a seamless experience, the company must decide between TCP and UDP protocols for different types of data transmissions.			**CO2**
	a)	Which protocol (TCP or UDP) would be better suited for each type of streaming (live vs. on-demand)? Explain your answer, referencing the characteristics of TCP and UDP protocol?	4	
	b)	Describe the end-to-end congestion control approaches TCP uses to manage network traffic.	4	
3.	A user opens a web browser and types `www.example.com` in the address bar. The browser first resolves the domain name to an IP address using the DNS protocol. Once the IP address is obtained, the browser sends an HTTP request to load a web page that contains 6 images, 2 CSS files, and 1 JavaScript file.			**CO4**
	a)	Explain the steps involved in DNS name resolution in this scenario.	4	
	b)	Compare the time and resource usage if the browser uses **non-persistent HTTP** versus **persistent HTTP** to load all the resources from the web server.	4	

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4.	A small internet café has a network of 20 computers connected to a single router that uses NAT to allow all the computers to share one public IPv4 address. However, due to IP address exhaustion, NAT complexity, and limited peer-to-peer connectivity, the administrator is considering upgrading to IPv6 for better efficiency and scalability.			CO2
	a)	Describe how **NAT** works in this scenario to enable multiple devices to access the internet using a single public IPv4 address.	4	
	b)	Explain **key advantages** of transitioning to **IPv6** in this scenario, particularly in terms of address availability, Enhanced Security and Quality of Service?	4	
5.	*a)*	Explain the key differences between packet switching and circuit switching in terms of **connection setup**, **data delivery**, and **efficiency**.	3	CO3
	b)	**Apply** the link state routing algorithm in the following figure to calculate the shortest route from source node A to destination I.	5	

