APPLIED SCIENCES FACULTY

UMI224 Assignment 4

Computer Network Systems | Pre-midterm review set

COURSE	SCOPE	FORMAT	DUE
UMI224	**Chapter 1**	**PDF or Word**	**Before the midterm**

> **Goal:** This assignment is designed as a focused pre-midterm review. Write your answers clearly and concisely. For numerical problems, show the main formula steps and include units where needed.

Submission Guidelines

- Submit one file in **PDF** or **Word** format.
- Answer all questions in order.
- For conceptual questions, write short but complete explanations.
- For problem questions, show the formula, substitution, and final answer.
- You may use lecture slides, your notes, and the textbook for review.

Questions

Selected from Chapter 1 for structured review before the midterm.

REVIEW QUESTION R12

R12

What advantage does a circuit-switched network have over a packet-switched network? What advantages does TDM have over FDM in a circuit-switched network?

REVIEW QUESTION R16

R16

Consider sending a packet from a source host to a destination host over a fixed route. List the delay components in the end-to-end delay. Which of these delays are constant and which are variable?

REVIEW QUESTION R18

R18

How long does it take a packet of length 1,000 bytes to propagate over a link of distance 2,500 km, propagation speed 2.5 x 10^8 m/s, and transmission rate 2 Mbps? More generally, how long does it take a packet of length L to propagate over a link of distance d, propagation speed s, and transmission rate R bps? Does this delay depend on packet length? Does this delay depend on transmission rate?

REVIEW QUESTION R19

R19

Suppose Host A wants to send a large file to Host B. The path from Host A to Host B has three links, of rates R1 = 500 kbps, R2 = 2 Mbps, and R3 = 1 Mbps. (a) Assuming no other traffic in the network, what is the throughput for the file transfer? (b) Suppose the file is 4 million bytes. Dividing the file size by the throughput, roughly how long will it take to transfer the file to Host B? (c) Repeat (a) and (b), but now with R2 reduced to 100 kbps.

REVIEW QUESTION R23

R23

What are the five layers in the Internet protocol stack? What are the principal responsibilities of each of these layers?

PROBLEM P11

P11

In Problem P10, suppose R1 = R2 = R3 = R and dproc = 0. Further suppose that the packet switch does not store-and-forward packets but instead immediately transmits each bit it receives before waiting for the entire packet to arrive. What is the end-to-end delay?

PROBLEM P12

P12

A packet switch receives a packet and determines the outbound link to which the packet should be forwarded. When the packet arrives, one other packet is halfway done being transmitted on this outbound link and four other packets are waiting to be transmitted. Packets are transmitted in order of arrival. Suppose all packets are 1,500 bytes and the link rate is 2.5 Mbps. What is the queueing delay for the packet? More generally, what is the queueing delay when all packets have length L, the transmission rate is R, x bits of the currently-being-transmitted packet have been transmitted, and n packets are already in the queue?