FAST- National University of Computer & Emerging Sciences, Karachi.
Department of Computer Science
Quiz - 2, Spring 2023

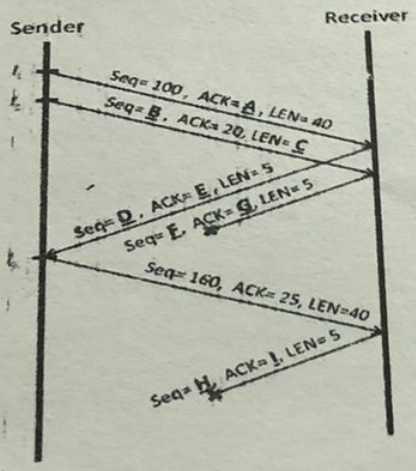
Course Code: CS3001	Course Name: Computer Networks
Instructors: Ms. Yusra Kaleem	
Student Name:	Section & Roll No.:

Time Allowed: 35 minutes
Maximum Points: 50

Note: Attempt any 5 questions, where question number 2,3 and 5 are COMPULSORY.

Question 1: [10 points]
Briefly discuss the following:
(a): Provide three advantages of UDP over TCP.
(b): The DNS requires reliability as one of the important features. However, DNS uses UDP instead of TCP, and UDP does not provide any reliable data transfer implementation, so data can be lost,
(i) so why UDP is used, and (ii) how reliability can be handled.

Question # 2: [10 points]
Complete the missing sequence numbers (Seq), acknowledgment numbers (ACK), and segment length (LEN) in the following TCP connection. We assume that:
- No timeouts occur at the receiver. The sender starts the timer at t1.
- The connection is full duplex (bi-directional data flow in same connection).
- The sender and the receiver have always data to transmit.
- There are no delayed acknowledgements at the sender or the receiver.

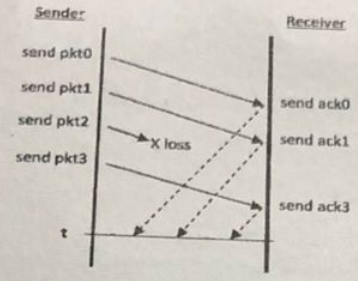


A	20
B	
C	20
D	
E	
F	
G	160
H	
I	

Question # 3 [10 points]

Consider the Figure given below.

Part a) Suppose the sender and receiver windows are of size N = 4 and suppose the sequence number space goes from 0 to 9. Show the position of the sender and receiver windows (buffer) over this sequence number space at time t (the horizontal line).



Part b) Suppose that it takes 1 ms to send a packet, with a 10 ms one-way propagation delay between the sender and receiver. The sliding windows size is again $N = 4$. What is the channel utilization?

Question # 4: **[10 points]**

Design a reliable data transfer protocol between the sender and receiver, operating over a channel that can lose or corrupt packets (data or ACKs) and is error prone. Specify the protocol using finite state machine for the sender side.

Question # 5: **[10 points]**

A provider has been assigned the network 209.118.127.0/23 and wants to divide it among three customers. Ufone needs to accommodate up to 250 hosts, Zong needs to accommodate up to 48 hosts, and Telenor needs to accommodate up to 120 hosts. Fill the following table in your answer script with the details of the sub-networks that the provider can create to fit its customers' needs.

Question # 6: **[10 points]**

a) When a new device joins a network how it gets the IP address automatically? Explain the procedure with diagram.
b) In first two messages of DHCP what is the destination & sources address in IP packet header? Take 192.168.1.1 DHCP server IP. Why messages in DHCP are broadcast?

Question # 7: **[10 points]**

Consider the two 16-bit words (shown in binary) below. Compute the Internet checksum of a set of 16-bit words.
01001110 10001111 this binary number is 20111 decimal (base 10)
00111001 10111001 this binary number is 14777 decimal (base 10)