National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	Computer Networks	Course Code:	CS 3001
	Program:	BS (Computer Science)	Semester:	Fall 2025
	Duration:	15 minutes	Total Marks:	15
	Paper Date:	04-September-2025	Section	5A , 5C
	Exam Type:	Quiz 1 - Chapter 1	Page(s):	2

Student Name **Roll No.** **Section:**

Q1. Encircle the correct option: **[5 marks] [CLO 1]**

1. In a packet-switched network, each user transmits with probability 0.5 in a given time slot. What is the probability that a given user does not transmit?

   a) 0.25

   b) 0.50

   c) 0.75

   d) 0.98

2. Calculate the Bandwidth-Delay Product if the data rate is 100 Mbps and the round trip delay time is 10 milliseconds.

   a) 100 Mbit

   b) 1 Gbit

   c) 1 Mbit

   d) 10 Gbit

3. Which of the following delays is not a component of nodal delay?

   a) Transmission delay

   b) Propagation delay

   c) Processing delay

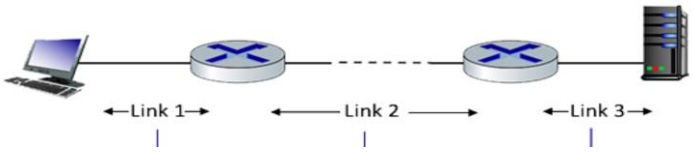
   d) Switching delay

True/False:

1. Internet Exchange Points (IXPs) are primarily used by end-users to directly connect their personal devices to the Internet. [T / F]
2. In packet switching, each packet may take a different route through the network before reaching the destination. [T / F]

Q2: Consider the following Network with 3 Links. You have to send a Packet of 1500 Bytes from Sender to Receiver. Propagation speed is 2.5×10^8 m/s. Link 3 is 100 km with transmission rate of 50 Mbps. Link 2 is 250 km long with rate 10 Mbps and Link 1 is 160 km long with rate of 5 Mbps. Processing delay is 0.5 ms for both switches (each). **[6 + 4 Marks] [CLO 1]**

1. Calculate the Transmission and Propagation delay for all links along with the End-to-end Delay (assume no queuing delay).
2. If circuit switching is used on the link 1 (5 Mbps) and each user transmits independently in a given time slot with probability $p = 0.25$, what is the maximum number of users that can be supported simultaneously, if each requires 2 Mbps? What is the probability that a given user is transmitting while all the other users are not transmitting? What is the probability that any 3 of the 8 users are transmitting simultaneously, and the remaining are not transmitting?



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Q1. Encircle the correct option: **[5 marks] [CLO 1]**

1. A _____ is formed at the transport layer by encapsulating an application layer message with transport layer headers.
   a) Segment
   b) Datagram
   c) Message
   d) Frame
2. Which of the following best describes a Computer Network:
   a) A collection of operating systems running simultaneously.
   b) A group of interconnected devices that can exchange data
   c) A single computer with multiple CPUs
   d) A distributed database for storing web pages
3. In a circuit switched network, a link has 200 Mbps capacity. Each user requires 27 Mbps when active. What is the maximum number of users that can be supported simultaneously?
   a) 5
   b) 7
   c) 10
   d) 13

True/False:

1. TCP/IP Service Model consists of 7 layers. [T / F]
2. Transmission delay for equal sized packets for a given link is variable. [T / F]

Q2: Consider the following Network with Hosts A, B, C and D and Switches S_1, S_2 and S_3. Processing Delay for each Switch is given with D_{proc}. **[8 + 2 Marks] [CLO 1]**

1. Calculate the Transmission and Propagation delay for all links (A to B) along with the End-to-end Delay (one way) if a packet of size 1500 bytes is sent from A to B. Assume, no Queuing Delay and Assume propagation speed to be 3×10^6 m/s.

2. Which is the bottleneck link from B to C? What is the Link Utilization of B to D if traffic is 1Mbps?