Switching (practice questions)

1. A path in a digital circuit-switched network has a data rate of 1 Mbps. The exchange of 1000 bits is required for the setup and teardown phases. The distance between two parties is 3000 km. Answer the following questions if the propagation speed is 2×10^8 m/s:

a. What is the total delay if 1000 bits of data are exchanged during the data transfer phase?

b. What is the total delay if 100,000 bits of data are exchanged during the data transfer phase?

c. What is the total delay if 1,000,000 bits of data are exchanged during the data transfer phase?

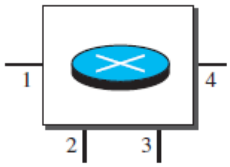
2. Five equal-size datagrams belonging to the same message leave for the destination one after another. However, they travel through different paths as shown in the following table

Datagram	Path Length	Visited Switches
1	3200 Km	1,3,5
2	11,700 Km	1,2,5
3	12,200 Km	1,2,3,5
4	10,200 Km	1,4,5
5	10,700 Km	1,4,3,5

We assume that the delay for each switch (including waiting and processing) is 3, 10, 20, 7, and 20 ms respectively. Assuming that the propagation speed is 2×10^8 m/s, find the order the datagrams arrive at the destination and the delay for each. Ignore any other delays in transmission.

3. Below figure shows a switch (router) in a datagram network.

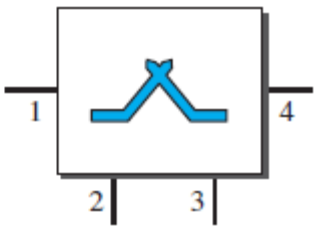
Destination address	Output port
1233	3
1456	2
3255	1
4470	4
7176	2
8766	3
9144	2



Find the output port for packets with the following destination addresses:
Packet 1: 7176
Packet 2: 1233
Packet 3: 8766
Packet 4: 9144

4. Below figure shows a switch in a virtual circuit network.

Incoming		Outgoing	
Port	VCI	Port	VCI
1	14	3	22
2	71	4	41
2	92	1	45
3	58	2	43
3	78	2	70
4	56	3	11



Find the output port and the output VCI for packets with the following input port and input VCI addresses:
Packet 1: 3, 78
Packet 2: 2, 92
Packet 3: 4, 56
Packet 4: 2, 71