ITS323 – Quiz 1 Answers

Name: _____

ID: _____   Mark: _____ (out of 10)

Email address: _____ @ hotmail/gmail/other (that you used on Mailist)

Question 1 [2 marks]

    a) Draw the Internet protocol stack, giving the names of each layer. [1 mark]

Answer

      Application

      Transport

      Network

      Data Link

      Physical

    b) For the following examples addresses, indicate which layer they correspond to. [1 mark]

      i.   Port 80   Layer: _____

      ii.   Port 443   Layer: _____

      iii. The 32-bit IP address 72.16.4.3   Layer: _____

      iv. The 48-bit IEEE MAC address 00:17:31:5a:e5:89 Layer: _____

      v.   steve@siit.tu.ac.th   Layer: _____

      vi. www.google.com   Layer: _____

Answer

Port numbers (e.g. 80 and 443): Transport layer

IP address: Network layer

48-bit MAC address: Data Link (or Physical) Layer

Email address: Application layer

Domain name: Application layer

Question 2 [3 marks]

True or False – circle the most accurate answer:

   a) All protocols are implemented as part of the operating system.   T   **F**

   b) A different protocol may be used for each layer of the TCP/IP protocol architecture. **T**   F

   c) A protocol is the same as a standard.   T   **F**

   d) An application may implement more than one protocol.   **T**   F

   e) A protocol may be implemented in hardware or software.   **T**   F

   f) Considering the performance requirements of different types of traffic, audio traffic and
       video traffic have the same requirements.   T   **F**

   g) Considering the performance requirements of different types of traffic, data traffic and audio
       traffic have the same requirements.   T   **F**

   h) If the average delay of 10 messages is 30ms, then the jitter is 30ms.   T   **F**

   i) If the average delay of 10 messages is 20ms, then the jitter is 2ms.   T   **F**

   j) With a point-to-multipoint link, the transmission of A can be received by both B and C at
       the same time.   **T**   F

   k) With a half-duplex link, A can transmit to B, but B cannot transmit to A.   T   **F**

   l) With a half-duplex link, A can transmit to B and B can transmit to A, but not at the same
       time.   **T**   F

   m) With a point-to-point simplex link, the transmission of A can be received by both B and C at
       the same time.   T   **F**

   n) With a point-to-point full-duplex link, the transmission of A can be received by both B and
       C at the same time.   T   **F**

Question 3 [3 marks]

Consider the network below with source A sending a message to destination C. The message passes via B.
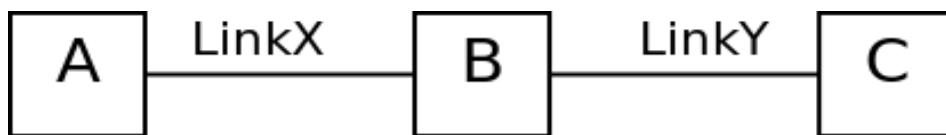
Calculate the delay for the message for conditions in the table below. Assume both processing delay and queuing delay for all devices is 0.

Message size	1000 Bytes
Link X	
- Signal speed	2.00E+008 m/s
- Data rate	1 Mb/s
- Distance	10000 m
Link X	
- Signal speed	2.00E+008 m/s
- Data rate	2 Mb/s
- Distance	10000 m

Transmission	
- A-B	0.008000000 s
- B-C	0.004000000 s
Propagation	
- A-B	0.000050000 s
- B-C	0.000050000 s
Total Delay	0.012100000 s
	12.1 ms

Message size	1000 Bytes
Link X	
- Signal speed	2.00E+008 m/s
- Data rate	4 Mb/s
- Distance	100000 m
Link X	
- Signal speed	2.00E+008 m/s
- Data rate	2 Mb/s
- Distance	100000 m

Transmission	
- A-B	0.002000000 s
- B-C	0.004000000 s
Propagation	
- A-B	0.000500000 s
- B-C	0.000500000 s
Total Delay	0.007000000 s
	7 ms

Message size	2000 Bytes
Link X	
- Signal speed	2.50E+008 m/s
- Data rate	8 Mb/s
- Distance	25000 m
Link X	
- Signal speed	2.50E+008 m/s
- Data rate	16 Mb/s
- Distance	25000 m

Transmission	
- A-B	0.002000000 s
- B-C	0.001000000 s
Propagation	
- A-B	0.000100000 s
- B-C	0.000100000 s
Total Delay	0.003200000 s
	3.2 ms

Message size	2000 Bytes
Link X	
- Signal speed	2.00E+008 m/s
- Data rate	2 Mb/s
- Distance	100000 m
Link X	
- Signal speed	2.00E+008 m/s
- Data rate	4 Mb/s
- Distance	100000 m

Transmission	
- A-B	0.008000000 s
- B-C	0.004000000 s
Propagation	
- A-B	0.000500000 s
- B-C	0.000500000 s
Total Delay	0.013000000 s
	13 ms

Message size	1500 Bytes
Link X	
- Signal speed	2.50E+008 m/s
- Data rate	24 Mb/s
- Distance	25000 m
Link X	
- Signal speed	2.50E+008 m/s
- Data rate	12 Mb/s
- Distance	25000 m

Transmission	
- A-B	0.000500000 s
- B-C	0.001000000 s
Propagation	
- A-B	0.000100000 s
- B-C	0.000100000 s
Total Delay	0.001700000 s
	1.7 ms

Question 4 [2 marks]

To send a 1KB file from A to B, the layers within a protocol architecture contribute an additional 200B of overhead. If the data rate of the link from A to B is 6Kb/s, what is the maximum throughput achieved when sending the file?

Answer

Total of 1.2KB sent, but only 1KB of data. Therefore efficiency is 5/6, and throughput is 5Kb/s.

Other answers:

      2KB file, 200B overhead, 11Mb/s: 10Mb/s

      2KB file, 500B overhead, 10Mb/s: 8Mb/s

      1.5KB file, 500B overhead, 8KB/s: 6KB/s

      1KB file, 500B overhead, 6Kb/s: 4Kb/s