ITS 323 – QUIZ 1 EXTRA (IT) ANSWERS

First name: _____   Last name: _____
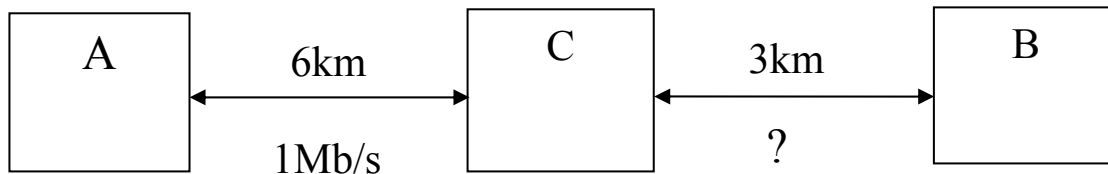

ID: _____   Total Marks: _____
<div align="right">out of 5</div>

Question 1 [3.5 marks]

Consider the network shown below in which two cable links are used to connect A to B (via C).

If a message of size 100 bits has to be sent from A to B with a maximum delay of 175/200/250usec, then
what is the minimum data rate required over the second link?

You can assume the transmission velocity is 3×10^8 m/s for each cable. Also assume there are no processing delays at any node, and no queuing delay at nodes A or B.

Answer

This question varied across the three quizzes: the total delay had a limit of 175, 200 or 250 usec. I will use the case of 200usec to illustrate the answer.

The total delay must be less than 200usec. The components of delay from A to B are:

Propagation time = Distance/Velocity

Transmission time = Datasize/Rate

Queuing delay = 20usec

Processing delay = 0sec

For the first link, the propagation delay is $(6 \times 10^3)/(3 \times 10^8) = 2 \times 10^{-5} = 20$usec.

For the second link, the distance is half the first link, so the propagation delay is half: 10usec

The transmission delay over the first link is $(1 \times 10^2)/(1 \times 10^6) = 1 \times 10^{-4} = 100$usec.

The transmission delay over the second link is $(1 \times 10^2)/R$ where R is the data rate of the link (which we are trying to calculate).

So the total delay is: 20usec + 20usec + 10usec + 100usec + $(1 \times 10^2)/R$

And this must be less than 200usec. Or, 150usec + $(1 \times 10^2)/R < 200$usec, or $(1 \times 10^2)/R < 50$usec. Therefore the minimum data rate needed is R = $(100)/(50 \times 10^{-6}) = 2 \times 10^6 = 2$Mb/s

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In your answer you do not have to explain all the steps in detail, but simply show the calculations of propagation, transmission delays, and that the total delay should be less than or equal to 200usec.

For the other questions, the answers are: 175usec => 4Mb/s and 250usec => 1Mb/s

Question 2 [1.5 marks]

Multiple choice questions – circle the most accurate answer (one answer only per question).

Answer:

The choices available differed for each of the three quizzes – the possible correct answers are marked.

A web browser, such as Firefox or Internet Explorer:

    a) Only implements the Application layer and Transport layer of the TCP/IP stack

    b) Normally implements all layers in the TCP/IP stack

    c) Only implements the Application layer of the TCP/IP stack

    d) Normally implements all layers in the OSI 7-layer stack

    e) Implements the Internet Protocol (IP) from the TCP/IP stack

    f) Implements the Transport and Network layers of the TCP/IP stack

The address 192.168.1.3 is an example of a:

    a) Transport layer address

    b) Port address

    c) Logical address

    d) Hardware address

    e) MAC address

    f) Network address

If a protocol adds a 20 byte header to a message, and the original message size is 60/80 bytes, then:

    a) The efficiency of the protocol is 75% (if message was 60bytes)

    b) The efficiency of the protocol is 60%

    c) The efficiency of the protocol is 80% (if message was 80bytes)

    d) The efficiency of the protocol is 20%

    e) The efficiency of the protocol is 25%

    f) The throughput of the protocol would be 0.6Mb/s if the data rate was 1Mb/s

    g) The throughput of the protocol would be 0.8Mb/s if the data rate was 1Mb/s

    h) The throughput of the protocol would be 0.2Mb/s if the data rate was 1Mb/s