ITS323 – Quiz 2

Name: _____

ID: _____   Mark: _____ (out of 10)

Question 1 [4 marks]

Consider a network with two links:

Computer ----------------- Router ------------------ Server

link1   link2

- Link 1: full-duplex; 10Mb/s; 10μs propagation time
- Link 2: full-duplex; 1Mb/s; 13μs propagation time

On the Computer, you click on a link in a browser which triggers a 100 Byte message to be sent to the Server. The server processes the request and sends a 1000 Byte response. What is the response time, that is, the time from when you click on a link until the response is received? Assume all processing and queuing delays are 0, *except* a 10μs queuing delay at the Router. You must show calculations.

Question 2 [3 marks]

    a) Draw a plot of the following signal in the frequency domain. [2 marks]

$s(t) = 10\sin(60\pi t) + 5\sin(120\pi t) + 2\sin(200\pi t)$

    b) What is the absolute bandwidth of the above signal? [1 mark]

Question 3 [3 marks]

A receiver receives a 4MHz signal with power 150mW.

    a) If the channel also contains noise of 10mW, what is the theoretical data rate possible? [2 marks]

    b) Assuming the noise cannot be controlled, explain how can the data rate be increased, without increasing the bandwidth. [1 mark]