ITS323 – Quiz 3
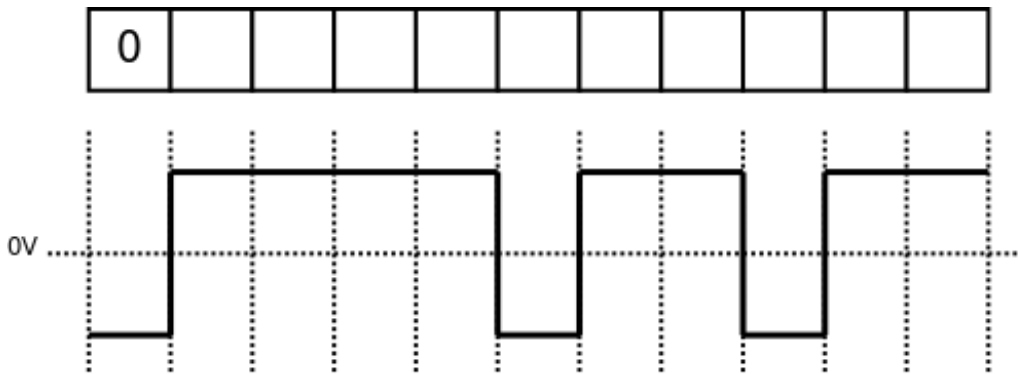
Name: _____

ID: _____   Mark: _____ (out of 10)

Question 1 [2 marks]

The following signal was created using NRZ-Invert-on-ones. Fill in the boxes to indicate the received bits.

Question 2 [4 marks]

Consider the following digital data.

111000101001

a) Draw the signal produced if Binary PSK is used to modulate the data. [2 marks]

b) Assuming the frequency of the lowest frequency signal in the above analog signal is 400MHz, what is the data rate? [1 mark]

c) If you double the number of signal levels compared to binary PSK, what would the answer of part (b) be? [1 mark]

Question 3 [4 marks]

Consider the Hamming-distance based forward error correction scheme with codewords in the table below.

Data	Codeword
00	001100
01	010101
10	110011
11	101110

The source has the data 10 to send.

a) What is received codeword if the last three bits are in error? [1 mark]

b) Explain the outcome at the received. E.g. error detected, corrected, data received, is the received data correct. Why? [2 marks]

c) Assuming no bit errors on a link with data rate 1.2Mb/s, what is the throughput using the above FEC scheme? [1 mark]