

ELEX 3525: Data Communications
2022 Fall Term

Quiz 2

11:30 – 12:00

Wednesday, October 19, 2022

SW01-2590

This exam has three (3) questions on one (1) pages. The marks for each question are as indicated. There are a total of nine (9) marks. Answer all questions. Write your answers and all rough work in this paper and nowhere else. Show your work. Draw a box around your final answer. Numerical answers must include units. Books and notes are allowed. No electronic devices other than calculators are allowed. **Show your work.**

This exam paper is for:

Questions Version 1 A00123456

Each exam is equally difficult.

Answer your own exam.

Do not start until you are told to do so.

Name: _____

BCIT ID: _____

Signature: _____

Question 1

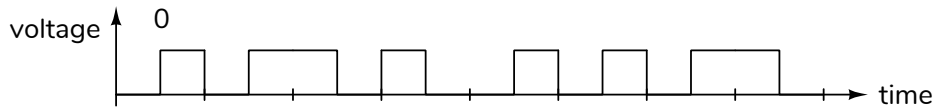
3 marks

A communication system operates over an “additive white Gaussian noise” or AWGN channel that adds zero-mean Gaussian noise. The noise voltage is measured as 300 mV (rms). The receiver makes an error if the noise voltage exceeds +1 V. What is the probability that the receiver makes an error?

Question 2

3 marks

The waveform below represents data encoded using a *differential* Manchester line code using the conventions described in the lecture notes. If the first bit transmitted was a zero (0) as shown, write the value of rest of the bits on the diagram. Each tick mark indicates one symbol period.



Question 3

3 marks

Draw the waveform that would be used to encode the following data sequence:

0 1 0 1 0 0 0 0 0 0 1 0 1

on the section of graph paper below using an NRZI line code with bit-stuffing after every 6 zero bits. Assume the previous bit was transmitted as a low level as shown. Write in the bits transmitted in each interval and indicate any stuffed bits.



ELEX 3525: Data Communications

2022 Fall Term

Quiz 2

11:30 – 12:00

Wednesday, October 19, 2022

SW01-2590

This exam has three (3) questions on one (1) pages. The marks for each question are as indicated. There are a total of nine (9) marks. Answer all questions. Write your answers and all rough work in this paper and nowhere else. Show your work. Draw a box around your final answer. Numerical answers must include units. Books and notes are allowed. No electronic devices other than calculators are allowed. **Show your work.**

This exam paper is for:

Questions Version 2 A00123456

Each exam is equally difficult.

Answer your own exam.

Do not start until you are told to do so.

Name: _____

BCIT ID: _____

Signature: _____

Question 1

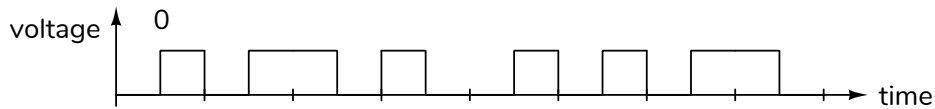
3 marks

A communication system operates over an “additive white Gaussian noise” or AWGN channel that adds zero-mean Gaussian noise. The noise voltage is measured as 400 mV (rms). The receiver makes an error if the noise voltage exceeds +1 V. What is the probability that the receiver makes an error?

Question 2

3 marks

The waveform below represents data encoded using a *differential* Manchester line code using the conventions described in the lecture notes. If the first bit transmitted was a zero (0) as shown, write the value of rest of the bits on the diagram. Each tick mark indicates one symbol period.



Question 3

3 marks

Draw the waveform that would be used to encode the following data sequence:

0 0 1 1 0 0 0 0 0 0 1 0 1

on the section of graph paper below using an NRZI line code with bit-stuffing after every 6 zero bits. Assume the previous bit was transmitted as a low level as shown. Write in the bits transmitted in each interval and indicate any stuffed bits.

