ELEX 3525 : Data Communications
2022 Fall Term

MIDTERM EXAM 1
11:30 – 12:20
Wednesday, October 5, 2022
SW01-2590

This exam has four (4) questions on one (1) pages. The marks for each question are as indicated. There are a total of twelve (12) 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:

Sample Exam 1   A00123456

Each exam is equally difficult.

Answer your own exam.

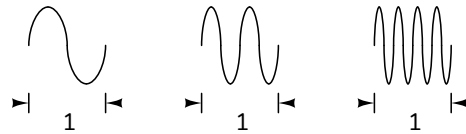Do not start until you are told to do so.

Name: _____

BCIT ID: _____

Signature: _____

(0)

Question 1   4 marks

A data source can generate three different waveforms:

    The duration of each waveform is 1 ms. The probabilities of the waveforms are 0.125, 0.5 and 0.375.

- What is the symbol rate?

- What is the entropy of the source?

- What is the information rate of the source?

Question 2   4 marks

The Japanese character for Electricity is 電 and has a Unicode code point of U+96FB. What is the UTF-8 encoding? Give your answer as a sequence of bytes in hexadecimal.

Question 3   2 marks

A serial interface uses a DB-9 connector. You measure the voltage on pin 6 as 9 V.

- Is this connector wired as a DTE or DCE? Briefly explain how you arrived at your answer.

- Could you connect this port directly to a typical PC serial port which is set up as a DTE? If not, how could such a connection be achieved?

Question 4   2 marks

The bits corresponding to the ASCII (or UTF-8) encodings of the characters **AT** are transmitted lsb-first. Write out the bits in the order they would be transmitted. Do not include start, stop or parity bits – only the data bits in lsb-first order.

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This exam paper is for:

Sample Exam 2   A01234567

Each exam is equally difficult.

Answer your own exam.

Do not start until you are told to do so.
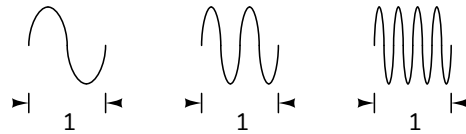
Name: _____

BCIT ID: _____

Signature: _____

Question 1 — 4 marks

A data source can generate three different waveforms:

The duration of each waveform is $1\,\mu s$. The probabilities of the waveforms are 0.125, 0.5 and 0.375.

- What is the symbol rate?

- What is the entropy of the source?

- What is the information rate of the source?

Question 2 — 4 marks

The Japanese character for Table is 卓 and has a Unicode code point of U+5353. What is the UTF-8 encoding? Give your answer as a sequence of bytes in hexadecimal.

Question 3 — 2 marks

A serial interface uses a DB-9 connector. You measure the voltage on pin 4 as 9 V.

- Is this connector wired as a DTE or DCE? Briefly explain how you arrived at your answer.

- Could you connect this port directly to a typical PC serial port which is set up as a DTE? If not, how could such a connection be achieved?

Question 4 — 2 marks

The bits corresponding to the ASCII (or UTF-8) encodings of the characters **AT** are transmitted lsb-first. Write out the bits in the order they would be transmitted. Do not include start, stop or parity bits – only the data bits in lsb-first order.