

ELEX 3525 : Data Communications
2022 Fall Term

Quiz 1

11:30 – 12:00

Wednesday, September 21, 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 eight (8) 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**1 marks**

Dolphins generate sounds with frequency components up to 200 kHz. What minimum sampling frequency would be required to digitize dolphin sounds?

Question 2**1 marks**

A sound card manufacturer claims their hardware uses 24-bit samples. What would be the approximate quantization SNR when using their sound card?

Question 3**2 marks**

The 32-bit value 0x87654321 is transmitted with the bytes in big-endian order. The bits in each byte are transmitted lsb-first. What are the first 16 bits transmitted? Give your answer as a sequence of bits (0's and 1's).

Question 4**4 marks**

The Runic alphabet used by the Vikings contained the letter “ear” (ᚱ) which has a Unicode code point of U+16E0.

Find the UTF-8 encoding for this character. Give the byte values in hex. Show your work.

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This exam paper is for:

Questions Version 2 A00123456

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Answer your own exam.

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Name: _____

BCIT ID: _____

Signature: _____

Question 1**1 marks**

Dolphins generate sounds with frequency components up to 150 kHz. What minimum sampling frequency would be required to digitize dolphin sounds?

Question 2**1 marks**

A sound card manufacturer claims their hardware uses 20-bit samples. What would be the approximate quantization SNR when using their sound card?

Question 3**2 marks**

The 32-bit value 0x12345678 is transmitted with the bytes in big-endian order. The bits in each byte are transmitted lsb-first. What are the first 16 bits transmitted? Give your answer as a sequence of bits (0's and 1's).

Question 4**4 marks**

The Runic alphabet used by the Vikings contained the letter “kaun” (\mathfrak{K}) which has a Unicode code point of U+16B4.

Find the UTF-8 encoding for this character. Give the byte values in hex. Show your work.