

ELEX 7860 : Wireless System Design
2024 Winter Term

Quiz 3

11:30 – 12:45

Friday, February 16, 2024

SW01-3150

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. Underline or 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:

Paper, Test 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

2 marks

A binary symmetric channel operates at a rate of 1 Mbps with a bit error rate of 0.1 (10%). Is it possible to transmit information over this channel, without errors, at a rate of 500 kbps? Explain.

Question 2

2 marks

Assuming an AWGN channel with an SNR of 0 dB, what is the minimum bandwidth that would enable error-free transmission at a rate of 10 kb/s?

Question 3

6 marks

A code contains the following four 8-bit codewords:

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

- (a) What is the minimum distance of this code?
- (b) What is the maximum number of errors in each codeword that are guaranteed to be detected?
- (c) What is the maximum number of errors in each codeword that are guaranteed to be corrected?

Question 4

2 marks

What are n and k for a Hamming code with a code rate of 0.968? *Hint: $n - k$ is less than 10.*

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This exam paper is for:

Paper, Test 2 A00123456

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Name: _____

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2 marks

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