

MIDTERM EXAM 2
10:30 AM – 11:20 AM
Friday, November 12, 2021

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:

Sample Exam 1 A00000000

Each exam is equally difficult.

Answer your own exam.

Do not start until you are told to do so.

Name: _____

BCIT ID: _____

Signature: _____

Question	Mark	Max.
1		4
2		2
3		3
Total		9

Question 1

4 marks

- (a) A data communication system uses NRZ with voltage levels of ± 3 Volts and a decision threshold at zero. What is the bit error rate if the channel adds AWGN with an RMS voltage of $1.5 V_{\text{rms}}$?
- (b) What is the BER if both levels are equally probable and the channel also adds an offset voltage of $+1$ V?

Question 2

2 marks

Write out the bits that would be transmitted if the bit sequence:

1001 1111 1111 0111

were to be framed using HDLC. Label the bits that you added and their purpose.

Question 3

3 marks

A communication system uses the simple CRC algorithm described in the lecture notes to detect errors. The generator polynomial is $x^4 + x + 1$. The received message is **10111110**. Did the received message contain an error? Show your work.

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