American International University-Bangladesh (AIUB)
Faculty of Engineering

COE 3101: Data Communication
Final Term Lab Assignment Question Paper

Instructions:
- **MATLAB** must be used to complete the assignment.
- This assignment must be submitted online as a **PDF** file on **VUES** under the component named '**FT LAB ASSIGNMENT**'.
- The file name must be '**FT LAB ASSIGNMENT ID.pdf**', where **ID** is your ID. For example, the file name can be **FT LAB ASSIGNMENT 19-34567-2.pdf**.
- On cover page of this assignment, **NAME**, **ID**, and **SECTION** must be mentioned clearly.
- **ID** related calculations must be presented clearly.
- Total grade is **10**.
- **Plagiarism will be penalized.**
- **Deadline: 10/12/2021 (Friday) 10:00 PM.**

Questions:

Assume your **ID** is **AB-CDEFG-H**.

Form a string of four characters, by taking any three letters and any two numbers of your choice. For example, your string can be '**6Lm7**' or '**4pT9**' or '**U8q7**'. Do not use any string from these examples. This is your text message. In this assignment you must show how we can transmit a text message and how we can recover the text message again at receiver.

a) Convert your text message into binary bit sequence.
b) Display the bit sequence from (**a**) as four level unipolar digital signal. Use **0** volt for binary '**0 0**', use **(G+5)** volt for binary '**0 1**', use **2*(G+5)** volt for binary '**1 0**', use **3*(G+5)** volt for binary '**1 1**'. Bit rate of your digital signal must be **(G+2)*10** bps.
c) Apply QASK on digital signal from (b). Use a carrier frequency of **(G+2)*100** Hz. Assume we are transmitting this analog signal.
d) Add noise to your modulated signal and assume that the noisy signal is your received signal.
e) Recover the bit sequence from the received noisy signal.
f) Display the recovered bit sequence from (**e**) as four level unipolar digital signal. Use **0** volt for binary '**0 0**', use **(G+5)** volt for binary '**0 1**', use **2*(G+5)** volt for binary '**1 0**', use **3*(G+5)** volt for binary '**1 1**'. Bit rate of your digital signal must be **(G+50)*200** bps.
g) Regenerate your text message from recovered bit sequence of (**e**).
h) Increase and decrease noise power at step (**d**) to analyze its impact on communication quality. What is your observation about impact of noise?

*** All codes must be inserted as text in the report.