BIMU 3066 - Data Communications – Midterm

Academic Year / Term	2020-2021 / Fall
Date	23.11.2020
Duration	60 Minutes

INSTRUCTIONS

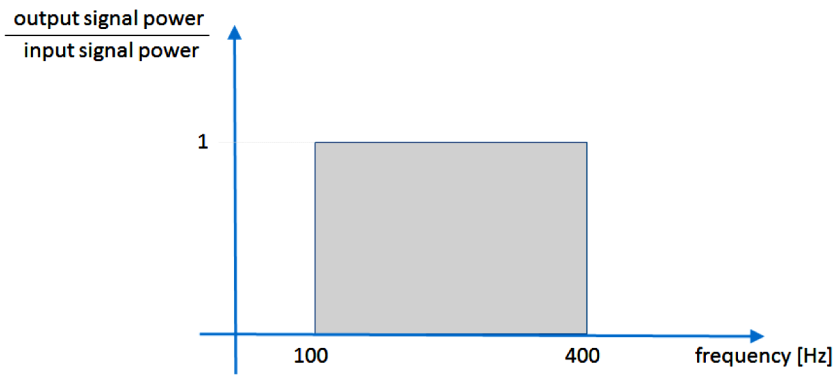
1. You should use blank white A4 papers to answer your questions.
2. You MUST write down the exam name, date, your student number and your name-surname at the beginning (top) of the first page of your papers. YOU
3. ALSO SHOULD SIGN this paper.
4. After writing down your answers, you should take full size readable photos of your papers and convert them to a SINGLE PDF document in correct page ORDER.
5. Please also DO NOT FORGET to NUMBER your pages in (x of y) or (x/y) format.
6. You should name your file as "YourStudentID_YourNameSurname.PDF"
7. Submit your document to assignment “Midterm Exam Submission (Part 1)” on lecture page on MERGEN system.
8. No submissions via e-mail will be accepted

Q1. For an amplifier with an effective noise temperature of 10,000 K and a 10-MHz bandwidth, what thermal noise level, in dBW, is expected as output?

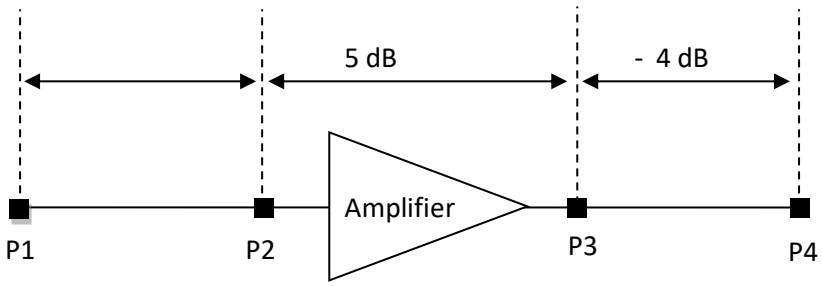
Q2. A signal with 200 milliwatts power passes through 10 devices, each with an average noise of 2 microwatts. What is the SNR and SNR_{dB}?

Q3. Consider the figure given for the following questions (A) and (B).

A) What is the channel capacity for a channel with the below frequency characteristics and a signal-to-noise ratio of 11.76 dB?
B) What is the required number of signaling levels to achieve this capacity?



Q4. A signal travels from point 1 to point 4. At point 1, the signal power is 120 W. The signal is attenuated by the time it reaches point 2, the power becomes 80w.



a) What is the attenuation and what is the total power decibel of the link? Is it gain or loss?
b) What is the signal power in point 4?

Q5. Sketch the NRZ, NRZI, Manchester, and Differential Machester encoding for the bit stream 000111010 on the following guide table. Assume that the NRZI signal starts out with low level voltage and the last level signal was high level before this stream in differential manchester)

(Use a similar guide table as following in your answer sheets)