

ECE435: Network Engineering – Homework 8

Due: Thursday 15 November 2018, 3:30pm

For this homework short answers will suffice.

To submit, create a document with your answers (text, pdf, libreoffice, MS Office if you must) and e-mail them to *vincent.weaver@maine.edu* by the homework deadline. Title your e-mail “ECE435 Homework 8” and be sure your name is included in the document.

1. Physical Layer – Bandwidth Calculations

- (a) You have a network connection where the signal to noise (S/N) ratio is 500. What is this equal to in dB? (HINT: $dB = 10\log\frac{S}{N}$)
- (b) You have a connection with 100MHz of bandwidth and 14dB S/N ratio. What’s your maximum transmission speed predicted by the Shanon theorem? (HINT: $bps = H\log_2(1 + \frac{S}{N})$, where H is bandwidth)

2. Physical Layer – Tradeoffs

- (a) Name one benefit fiber optics have over copper wire.
- (b) What is one benefit satellite connections have over fiber?
- (c) What is one benefit fiber connections have over satellite?

3. Physical Layer – Regulations

- (a) For your final project you decide to build a transmitter that transmits a 100W signal at 4.3GHz. Can you? Who is likely to get upset about this?