

ECE (435/535a) Spring 2016 Quiz #1
February 4

Name: _____ **Student Number:** _____

Signature: _____

Instructions: Answer all questions and show all work. Answers which are not justified with appropriate work will receive 0 points. Students who cheat will receive zero points on the exam and will be subject to the university's disciplinary procedure for academic dishonesty. Cheating includes, but is not limited to, collaborating or conferring in any way with anyone. Use of the internet is strictly forbidden. Your signature above attests that you are in compliance with these rules.

Problem	Points	Student's Score
1	50	
2	50	
Total:	100	

1. (50 points) Let X and Y denote two jointly distributed discrete valued random variables. Show that

$$H(X, Y) \leq H(X) + H(Y).$$

When does the equality hold?

2. (50 points) What is the channel capacity of the binary erasure channel with erasure probability ϵ .