

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

Department of Electrical and Computer Engineering

ECE 205A

Fall 2008

Instructor: K. Rose

Homework Assignment #3

(Due on Wednesday 10/29/2008)

Problem # 1. Text, Chapter 4, Prob. 23.

Problem # 2. Text, Chapter 5, Prob. 1.

Problem # 3. Text, Chapter 5, Prob. 2. (No need to worry about explaining the science-fiction-style title of this problem).

Problem # 4. Text, Chapter 5, Prob. 3.

Problem # 5. A non-asymptotic source coding converse theorem: Prove that any fixed length block code of rate R that encodes memoryless source words of blocklength n has a probability of decoding error P_e that satisfies:

$$P_e \geq \frac{H(X) - R}{\log |\mathcal{X}|} - \frac{1}{n \log |\mathcal{X}|}$$