

UNIVERSITY OF THE WEST INDIES
CAVE HILL CAMPUS

Department of Computer Science, Mathematics & Physics

ELET2230 - Digital Communications 1

Assignment 1

Due: October 31, 2020

1. If an information source consists of the five symbols A, B, C, D, E which are output with probabilities as shown in the table below, determine the corresponding Huffman code, its average length, source entropy and efficiency.

A	0.4	
B	0.16	
C	0.3	
D	0.10	
E	0.04	[10]

What is the Information Rate, R , if r_s is 175 sym/sec [2]

What is the probability of a binary digit zero at the output of this source encoder ? [4]

2. Code the follow using the Lempel-Ziv algorithm

10010110011101001

Then decode your result and compare with above. [8]

3. Consider a Discrete Memoryless Channel (DMC) in which two symbols x_1, x_2 enter and y_1, y_2 exit. Where the forward transition probabilities are $p(y_1|x_1) = 0.7$ and $p(y_2|x_2) = 0.8$

Determine the average Mutual Information [6]
(Assume symbol input probabilities are $p(x_1) = p(x_2) = 0.5$)