Coding Theory: Comprehensive Exam

To pass this exam, you need to solve completely at least four of the given six problems.

1. How many errors can the ternary linear code with a parity check matrix

$$H = \begin{pmatrix} 1000102\\0100201\\0010112\\0001221 \end{pmatrix}$$

correct using the Maximum-Likelihood Decoding algorithm? Explain your answer.

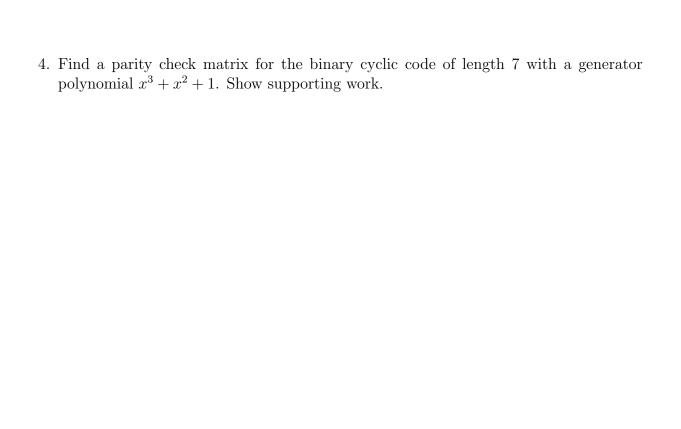
2. Consider the binary code with a parity check matrix

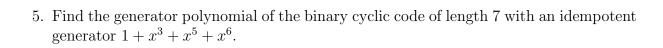
$$\left(\begin{array}{c} 101111\\011010\\000111 \end{array}\right).$$

Assume that an unknown codeword x was transmitted over a noisy channel, and the vector 000111 was received. Use syndrome decoding to find the codeword x. Show supporting work.

uistance that e	encodes at least five	ve information	symbols and c	corrects up to	three erro

3. Find the parameters of a Reed-Muller code of smallest length and smallest minimum





w supporting			

6. Give the check polynomial of a binary cyclic code of length 15 that can correct triple