EE5160: Error Control Coding
Problem Set 6

1. Let $g(X) = 1 + X + X^2 + X^4 + X^5 + X^8 + X^{10}$ be the generator polynomial of a $(15, 5)$ cyclic code over $\mathrm{GF}(2)$.

    (a) Construct the generator matrix of the code in systematic form.

    (b) Find the parity-check polynomial of the code.

2. Let α be a primitive element of $\mathrm{GF}(2^5)$ generated by the primitive polynomial $p(X) = 1 + X^2 + X^5$ (see Table 2.10). Find the generator polynomial of the triple-error-correcting primitive BCH code of length 31.

3. Using the Galois field $\mathrm{GF}(2^5)$ generated by the primitive polynomial $p(X) = 1 + X^2 + X^5$ (see Table 2.10) find the generator polynomial of the triple-error-correcting RS code over $\mathrm{GF}(2^5)$ of length 31.