

ECE 575 HW #4

① $p(x) = x^4 + x + 1$ $p(x) \rightarrow$ is a primitive polynomial

a) Using $p(x)$ generate $GF(2^4)$ elements

b) Find all the conjugate classes

c) Find all the minimum polynomials using conjugate classes

d) Find the order of every element in $GF(2^4)$

② $p(x) = x^4 + x^3 + x^2 + x + 1$

$p(x) \rightarrow$ irreducible

a) Using $p(x)$ show that $GF(2^4)$ can be generated

b) Find an element β in $GF(2^4)$ and using $p(x)=0$ show that β can generate all the field elements

③ Show that $x^5 + x^2 + 1$, $x^5 + x^3 + 1$ are primitive polynomials

Show that $x^6 + x^3 + 1$ is not primitive

④ Using $p(x) = x^3 + x^2 + 1$ generate $GF(2^3)$
Find all the minimum polynomials.