MA-403 Assaignment-4 Due on: 7/11/2022

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Note: (1) Write your name and registration number in capitals.
(2) Submit hard copies only by 7/11/2022

Q.1: Find all irreducible polynomials over $\mathbb{F}_3$ in X for degrees 1, 2, 3, 4. (20)
(20 = 2 + 3 + 5 + 10)

Q.2: a) Write the mult. tables of a finite fields F_1, F_2 of order 8 by defining multiplications on the set $\mathbb{F}_2^3 = \{a_0 + a_1 X + a_2 X^2 : a_i \in \{0, 1\}\}$ using the irreducible polynomials $X^3 + X^2 + 1$ and $X^3 + X + 1$ over $\mathbb{F}_2$.

b) Define a bijection $\theta : F_1 \to F_2$ explicitly such that, for all $x_1, x_2 \in F_1$,
$\theta(x_1 + x_2) = \theta(x_1) + \theta(x_2)$ & $\theta(x_1 x_2) = \theta(x_1)\theta(x_2)$
(Note that, as a bijection of sets, θ is just a bijection of the set $\mathbb{F}_2^3$.) -(30)
(30 = 15 + 15)

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