Backpaper exam - 2nd semester 2018
B.Math. Hons. 2nd year
Algebra IV
Instructor : B. Sury

Q 1. If L/K is an algebraic extension and $\alpha, \beta \in L$ have the same minimal polynomial over K, give a clear and complete proof that there is an isomorphism from $K(\alpha)$ to $K(\beta)$ which takes α to β and is identity on K.

Q 2. Prove that every finite extension of a finite field is a Galois extension.

Q 3. Determine the Galois group of the polynomial $X^4 - 2$ over $\mathbb{Q}$.

Q 4. If M is algebraic over L and L is algebraic over K, prove that M is algebraic over K.

Q 5. Prove that there exists an irreducible polynomial of any given degree over a finite field.