

METU, Spring 2014, Math 504.

Midterm (April 16)

1. State the Short Five Lemma.
2. Give the definitions of projective and injective modules. Give examples.
3. Give the definitions of bilinear maps and the tensor products. Explain the relation between them.
4. Let A be a module over a principal ideal domain R . Give the definition of the order $r \in R$ of an element $a \in A$. Illustrate the definition with a $\mathbf{Z}[i]$ -module.
5. Give the definition of algebraic and transcendental elements. Characterize the simple extensions of a field K with the help of $K[x]$ and $K(x)$.