

# Module MA3412: Examinable Material, Annual Examination 2014

February 20, 2014

## 1. Commutative Rings and Polynomials

- This section is *non-examinable*. Nevertheless candidates should be familiar with the basic material described here, which is fundamental to an understanding of commutative rings.

## 2. Integral Domains

- Subsections 2.1–2.3, 2.5, 2.6 and 2.12 are *examinable*.
- Subsections 2.4, 2.8–2.10 and 2.14 are *non-examinable*.
- Subsection 2.7 is *examinable* with the exception of the statement and proof of Proposition 2.25.
- In Subsection 2.11, candidates should be familiar with the definition of the *field of fractions* of an integral domain, and with the basic properties of fields of fractions stated in Proposition 2.44, Lemma 2.45 and Lemma 2.46. The remainder of the material in this subsection is *non-examinable*.
- In Subsection 2.13, candidates should be familiar with the statement of Proposition 2.48. The proof of that proposition is *non-examinable*.

## 3. Noetherian Rings and Modules

- Material in this section is all examinable with the exception of the proof of Theorem 3.8 (*Hilbert's Basis Theorem*).

## 4. Determinants and Integral Closures

- All proofs of results in subsection 4.1 are *non-examinable*.
- Subsection 4.2 is *examinable*, with the exception of the remarks following Theorem 4.9.
- Subsections 4.3–4.5 are *examinable*
- Subsection 4.6 is *examinable*, with the exception of the proof of Proposition 4.23.
- Subsection 4.7 is *examinable*.
- Subsection 4.8 is *non-examinable*

## 5. Discrete Valuations and Dedekind Domains

- Subsections 5.1–5.6 are *examinable*.
- Subsections 5.7–5.13 are *non-examinable*.
- The remark following Lemma 5.10 concerning the use of Zorn's Lemma to prove that every proper ideal of a unital commutative ring is contained in a maximal ideal is non-examinable.

## 6. Finitely-Generated Modules over Principal Ideal Domains

- Subsections 6.1–6.5 are *examinable*, with the exception of the proof of Proposition 6.2.
- Subsections 6.6–6.9 are *non-examinable*.