Module MA3429
Examinable Material, May 2011

David R. Wilkins

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Section 1: Topological Spaces and Smooth Manifolds

This section is basically **non-examinable**. No examination questions will be set directly on this material. The material of this section is relevant to the examination only to the extent that material in subsequent examinable sections of the module make reference to basic concepts discussed here.

Section 2: Tangent Spaces and Derivatives

This entire section is **examinable**.

Section 3: Submanifolds of Smooth Manifolds

This entire section is **non-examinable**.

Section 4: Fibre Bundles

This section is basically **non-examinable**. No examination questions will be set directly on this material. The material of this section is relevant to the examination only to the extent that material in subsequent examinable sections of the module make reference to basic concepts discussed here.

Section 5: Tensors and Multilinear Algebra

This section is basically **non-examinable**. No examination questions will be set directly on this material. The material of this section is relevant to the examination only to the extent that material in subsequent examinable sections of the module make reference to basic concepts discussed here.

Section 6: Vector Bundles

Subsections 6.1 (smooth vector bundles), 6.10 (the cotangent bundle) and subsection 6.11 (tensor fields) are examinable.

Subsection 6.3 (the tangent bundle) is **examinable**, with the exception of the proof of Proposition 6.7.

Subsections 6.2, 6.4–6.9, 6.12 and 6.13 are **non-examinable**.

Section 7: Vector Bundles

Subsections 7.1, 7.2 and 7.3 are **examinable**

The definition of local flows in subsection 7.4 and the following examples are **examinable** material. However Theorem 7.12, Proposition 7.13 and Corollary 7.14, and their proofs, are **non-examinable**.

Subsections 7.5 and 7.6 are **non-examinable**.

Section 8: Connections, Curvature and Torsion

Subsections 8.1, 8.3, 8.5, 8.7 and 8.8 are **examinable**.

In Subsection 8.2, the statement and proof of Proposition 8.4, and the definition of the *curvature* of a smooth connection which immediately follows the proof of Proposition 8.4, are **examinable**. The remaining material in this subsection is **non-examinable**.

With regard to Subsection 8.6, only Lemma 8.12 is **examinable**.

Subsection 8.4 is **non-examinable**.

Section 9: Riemannian and Pseudo-Riemannian Manifolds

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Subsections 9.1, 9.2 and 9.3 are **examinable**.

Subsection 9.4 is **non-examinable**.

Section 10: Covariant Derivatives along Curves and Surfaces

This entire section is **examinable**.

Section 11: Geodesics and Jacobi Fields

This entire section is **examinable**.