

B5a Techniques of Applied Maths: Classification of Exam Questions

Year/Question	Q1	Q2	Q3	Q4
2006	Perturbation Methods Poincare Lindstedt	Eigenvalues and eigenfunctions of a Sturm Liouville problem	Find Green's Function [1] Find eigenfunction expansion [4]	Derive conservation equation Develop jump conditions near shocks
2007	Nondimensionalisation Perturbation theory Oscillators	Perturbation theory Poincare-Lindstedt	Eigenvalues and eigenfunctions of a Sturm Liouville problem	Perturbation theory Develop jump conditions near a shock
2008	Perturbation theory Oscillators Poincare Lindstedt	Adjoint and self-adjoint of BVP Eigenvalues/eigenfunctions of BVP Green's functions	Adjoint of IE Eigenvalues and functions of IE FAT	Derive conservation equation Develop jump conditions near shocks
2009	Perturbation theory Oscillators Phase plane analysis	Adjoint vs. self-adjoint of BVP Adjoint, eigenvalues/functions of IE FAT	Conservation laws Shock conditions	
2009(R)	Perturbation theory Oscillators	Adjoint vs. self-adjoint of BVP Adjoint, eigenvalues/functions of IE FAT	Conservation laws Shock conditions	
2010	Finding Green's functions Define Green's function Using idea of distribution	Eigenvalues/functions of BVP Adjoint vs. self-adjoint of BVP Adjoint, eigenvalues/functions of IE FAT	Series solutions near singular points (Laguerre's equation) Orthogonality of eigenfunctions	
2011	Definition of test functions Using the idea of distributions Finding and defining Green's functions	Eigenvalues/functions of BVP Adjoint vs. self-adjoint of BVP Adjoint, eigenvalues/functions of IE FAT	Series solutions near singular points (Laguerre's equation) Orthogonality of eigenfunctions	
2012	Definition of test functions Using the idea of distributions Finding and defining Green's functions	Eigenvalues/functions of BVP Adjoint vs. self-adjoint of BVP Adjoint, eigenvalues/functions of IE FAT	Series solutions near singular points (Chebyshev's equation) Orthogonality of eigenfunctions	