Algebra Prelim Syllabus Topics:

Notes:
I tried to organize the old prelim questions in their specific topics but it was challenging to do that without trying to solve them outright.
The starred questions are in more than one subtopic of the big topics.
The questions that didn't have a specific subtopic went into the basic definitions and examples sections.

Saved Prelims for Practice: August 2008, January 2016, August 2018

Group Theory:
Basic definitions and examples: J20Q1, A19Q2, J19Q1, J18Q2, J17Q1, A16Q2, J15Q1, A13Q2, J12Q2, A11Q1&, J10Q1, A09Q1*, J14Q1
Lattice of subgroups/normal subgroups: A17Q1*, A14Q1, A13Q1&, J11Q1, A10Q1
Quotient groups: A17Q1*, A10Q2
Isomorphism theorems
Characterization of products *(I treated this kind of as the characterization of groups)*: A16Q1, **J16Q2**, J14Q2, J07Q2
Lagrange's Theorem
Cauchy's Theorem
Cayley's Theorem
Structure of finitely generated abelian groups
Group actions: A20Q1, A17Q2, **J16Q1**, J10Q1, A09Q2&, J09Q1*, **A08Q2***
Class equation: **A08Q2***
Sylow's Theorems: A20Q2, J20Q2*, **A18Q1**, J18Q1, J17Q2*, J15Q2*, J13Q2(a), J12Q1, A11Q2*, A09Q1(a)(c)&, J08Q1, J07Q1
Jordan-Hölder Theorem
Simple groups: A19Q1, J19Q2, A12Q1, J09Q1*, J09Q2, **A08Q1**
Solvable groups: J17Q2*&, J08Q2&, A12Q2
Semidirect products: J20Q2*, **A18Q5**, J15Q2*, J13Q1, A11Q2*&, A14Q2, J11Q2
Free groups
Presentations of groups
Nilpotent (I added): J13Q2(b), A09Q1(b)

ALL GROUP THEORY QUESTIONS (UNSORTED): A20Q1, A20Q2, J20Q1, J20Q2, A19Q1, A19Q2, J19Q1, J19Q2, **A18Q1**, **A18Q5**, J18Q1, J18Q2, A17Q1, A17Q2, J17Q1, J17Q2, A16Q1, A16Q2, **J16Q1**, **J16Q2**, J15Q1, J15Q2, A14Q1, A14Q2, J14Q1, J14Q2, A13Q1, J13Q1, J13Q2, A12Q1, A12Q2, J12Q1, J12Q2, A11Q1, A11Q2, J11Q1, J11Q2, A10Q1, A10Q2, J10Q1, J10Q2, A09Q1, A09Q2, J09Q1, J09Q2, **A08Q1**, **A08Q2**, J08Q1, J08Q2, J07Q1, J07Q2

Ring Theory:

Basic definitions and examples: A20Q3&, J19Q3, **A18Q2**, **A18Q4**, A16Q3, A13Q3, A10Q3
Lattice of subrings/ideals: A14Q3
Prime ideals: A12Q3&, J11Q3, J10Q3, A09Q3, J09Q3
Quotient rings
Chain conditions
Rings of fractions: J15Q3*
Chinese Remainder Theorem
Euclidean domains: J18Q3, J15Q3*, **A08Q3***, J20Q3
PID's: J17Q3, J14Q3, **A08Q3***
UFD's: A19Q3, **J16Q3**, J13Q3, A11Q3, J07Q3, J12Q3
Polynomial rings
Irreducibility criteria for polynomials

ALL RING THEORY QUESTIONS (UNSORTED): A20Q3, J20Q3, A19Q3, J19Q3, **A18Q2**, **A18Q4 (?)**, J18Q3, J17Q3, A16Q3, **J16Q3**, J15Q3, A14Q3, J14Q3, A13Q3, J13Q3, A12Q3, J12Q3, A11Q3, J11Q3, A10Q3, J10Q3, A09Q3, J09Q3, **A08Q3**, J08Q3, J07Q3

Modules and Linear Algebra:
Basic definitions and examples: J19Q4, **A18Q6**, J18Q4, A16Q4, A13Q4, A12Q4, A11Q4, A10Q4, A09Q4, J09Q4, **A08Q4**, [J07Q4 (not in our syllabus anymore)]
Lattice of submodules: J14Q4
Quotient modules
The matrix of a linear transformation
Minimal polynomial of a transformation: A19Q4*
Cayley-Hamilton Theorem over a commutative ring
Trace and determinant: J17Q4, J08Q4
Dual spaces
Modules over a PID: J20Q4, **J16Q4**
Rational canonical form: J11Q4*, A14Q4
Jordan canonical form: A20Q4, A19Q4*, J15Q4, J12Q4, J11Q4*

ALL MODULES AND LIN ALG QUESTIONS (UNSORTED): A20Q4, J20Q4, A19Q4, J19Q4, **A18Q6**, J18Q4 (?), J17Q4, A16Q5, **J16Q4**, J15Q4, A14Q4, J14Q4, A13Q4, A12Q4, J12Q4, A11Q4, J11Q4, A10Q4, A09Q4, J09Q4, **A08Q4**, J08Q4, J07Q4

Field Theory:
Basic definitions and examples: J20Q5, A19Q5, A17Q5, **J16Q5**, A14Q5, A12Q5, J07Q5
Field extensions: A13Q5, A11Q5, A11Q6
Simple extensions
Algebraic extensions: J17Q5*

Transcendental extensions
Separable extensions: J18Q5*, J09Q5
Cyclotomic extensions: A20Q5, J19Q5, A17Q6*, J13Q6, A12Q6, J10Q5
Solution of the Greek construction problems: A13Q6
Splitting fields and normality: J17Q5*, J17Q6, A16Q6*, A10Q6, **A08Q5**, **A08Q6***, J08Q5 (same as A10Q6 but without hints or guidance), J07Q6*
Algebraic closure: J11Q5, J08Q6*
The Galois correspondence (FTGT): J15Q6*, A10Q5(?), A09Q6, J07Q6*
Galois groups of extensions/polynomials: A20Q6, J20Q6, A19Q6, J19Q6, **A18Q3**, J18Q5*, J18Q6, A17Q6*, A16Q6*, **J16Q6**, J15Q6*, J15Q5(?), A14Q6, J14Q6, J12Q6*, J11Q6, J09Q6, **A08Q6***, J08Q6*, J07Q6*
Solvable and radical extensions: J12Q6*, J10Q6
The insolvability of the quintic
Fundamental Theorem of Algebra
Finite fields: J13Q5, J12Q5, A09Q5
Frobenius endomorphism: A16Q5

ALL FIELD THEORY QUESTIONS (UNSORTED): A20Q5, A20Q6, J20Q5, J20Q6, A19Q5, A19Q6, J19Q5, J19Q6, **A18Q3**, J18Q5, J18Q6, A17Q5, A17Q6, J17Q5, J17Q6, A16Q5, A16Q6, **J16Q5**, **J16Q6**, J15Q5, J15Q6, A14Q5, A14Q6, J14Q6, A13Q5, A13Q6, J13Q5, J13Q6, A12Q5, A12Q6, J12Q5, J12Q6, A11Q5, A11Q6, J11Q5, J11Q6, A10Q5, A10Q6, J10Q5, J10Q6, A09Q5, A09Q6, J09Q5, J09Q6, **A08Q5**, **A08Q6**, J08Q5, J08Q6, J07Q5, J07Q6

Miscellaneous:
Applications of Zorn's Lemma: J14Q5

Ones I couldn't sort: A17Q3, A17Q4