Exam questions for Discrete Mathematics 2017, these questions are in beta, and might be changed.

Logic

- Explain sentences: negation (not), conjunction (and), and disjunction (or), tautologies and contradictions
- Explain truth tables
- Present some laws of logical equivalence including De Morgan's law
- Explain conditional statements, their contrapositive, converse, and inverse, hypothesis and conclusion
- Explain arguments, modus ponens and modus tollens

Predicates and Quantified statements

- Define predicates and their truth sets
- Explain the universal and existential quantifiers
- Present some arguments with qualified statements
- Present some laws of multi-qualified statements including De Morgan's law

Set Theory

- Define a set
- How can an ordered pair be defined using sets only?
- Explain the Cartesian product
- Define a relation and a function, what is the empty set and a powerset
- Define subsets and set equality
- Present some laws on sets

Regular Expressions and Finite-state Automata

- Define "alphabet", "string", and "language"
- What is the Kleene closure of a language?
- How are regular expressions defined?
- Explain the parts of a finite-state automaton
- Define the eventual-state function
- Explain the relation between regular languages and languages accepted by a finite-state automaton

Sequences, Induction and Recursion

- Define a sequence
- Explain summations and telescopic sums
- Explain products and theorems for working with sums and products
- Explain factorials and combinations
- Describe the induction principles
- Explain recursion

Relations

- Define a relation on a set
- Explain reflectivity, symmetry, and transitivity
- What is the relation defined by a partition?
- Explain antisymmetry and partial ordering of sets

Design by contract

- Explain the ideas behind design by contract
- Present the general content of design by contract code
- Present the parts of design by contract that you consider to be most important
- Evaluate the usability of design by contract