

# Many-Valued Logics (Autumn 2013)

## Sample final exam

- Time allowed is 3 hours.
- Grading is from 0 to 100.
- The use of class material is not allowed.
- Success!

20 pt

**Exercise 1.** (BL-algebras)

Prove that any BL-algebra has an underlying distributive lattice i.e., prove that in any BL-algebra the following holds:

$$x \vee (y \wedge z) = (x \vee y) \wedge (x \vee z).$$

20 pt

**Exercise 2.** (Algebraic Logic)

Give an example of a deductive system which is not algebraizable. Prove your statement.

20 pt

**Exercise 3.** (Residuated lattices)

Show that the class of residuated lattices is closed under McNeille completions.

20 pt

**Exercise 4.** (Algebraic proof theory)

Give a sketch of the proof (just the main ideas) that any analytic rule preserves cut-elimination when added to *FL*.

20 pt

**Exercise 5.** (MV-algebras)

Prove that any finitely generated subalgebra of a free MV-algebra is finitely presented.