University of Helsinki
Department of Mathematics and Statistics
Introduction to Logic 1
Course Examination
March 3, 2020

1. Use resolution to show that $p_0 \leftrightarrow p_2$ is a logical consequence of the assumptions $p_0 \leftrightarrow p_1$ and $p_1 \leftrightarrow p_2$

2. Use natural deduction to derive $\neg B$ from A and $\neg A \vee \neg B$.

3. Give a semantic proof of

$$(A \vee (B \wedge C)) \rightarrow ((A \vee B) \wedge (A \vee C)).$$

4. (a) Explain what is meant by soundness of natural deduction.
   (b) Is the propositional formula

$$(p_0 \rightarrow (p_1 \vee p_2)) \rightarrow (p_0 \rightarrow p_1)$$

   derivable by natural deduction?

5. Using truth table method, determine whether the propositional formula

$$(p_0 \wedge p_1) \rightarrow p_2$$

   is a logical consequence of the propositional formula

$$p_0 \wedge (p_1 \rightarrow p_2).$$

Notes, tables, or calculators are not allowed in the exam.