LGIC 010 & PHIL 005
Problem Set 1
Spring Term, 2016
DUE IN CLASS MONDAY, JANUARY 25

1. (25 points) Let X be a finite set of positive integers. We say X is *good* if and only if for every nonempty set Y contained in X, the sum of the members of Y is not divisible by 10. What is the largest number n, such that there is a good set X with exactly n members? Give an example of a good set of that size. Explain why there is no larger good set.

2. (25 points) Is the conjunction of the following schemata truth-functionally satisfiable? Explain your answer.

   - $(p_{11} \vee p_{12}) \wedge (p_{21} \vee p_{22}) \wedge (p_{31} \vee p_{32})$
   - $p_{11} \supset \neg(p_{21} \vee p_{31})$
   - $p_{21} \supset \neg(p_{11} \vee p_{31})$
   - $p_{31} \supset \neg(p_{11} \vee p_{21})$
   - $p_{12} \supset \neg(p_{22} \vee p_{32})$
   - $p_{22} \supset \neg(p_{12} \vee p_{32})$
   - $p_{32} \supset \neg(p_{12} \vee p_{22})$

3. (25 points) How many truth assignments to the sentence letters $p_1, \ldots, p_5, q_1, \ldots, q_5$ satisfy the following schema?

$$(p_1 \supset q_1) \wedge \ldots \wedge (p_5 \supset q_5)$$

4. (25 points) Recall that $\oplus$ represents exclusive disjunction. How many truth assignments to the sentence letters $p_1, \ldots, p_5$ satisfy the following schema?

$$((((p_1 \oplus p_2) \oplus p_3) \oplus p_4) \oplus p_5)$$