**LGIC 010 & PHIL 005**
**Problem Set 1**
**Spring Term, 2010**

1. (33 points) Test the following schemata for validity.

   (a) $(p \equiv q) \vee (p \equiv r) \vee (q \equiv r)$

   (b) $(\neg p \supset q) \supset ((p \supset q) \supset q)$

   (c) $(p \oplus (q \oplus r)) \equiv ((p \oplus q) \oplus r)$ (Recall that "$\oplus$" represents exclusive disjunction.)

2. (55 points) In each case, determine whether the first schema implies the second.

   (a) $(p \wedge r) \equiv (q \wedge r)$ $\quad$ $p \equiv q$

   (b) $(p \supset q)$ $\quad$ $(\neg p \supset \neg q)$

   (c) $(q \supset p)$ $\quad$ $(\neg p \supset \neg q)$

   (d) $(p \wedge q) \vee r$ $\quad$ $p \wedge (q \vee r)$

   (e) $p \wedge (q \vee r)$ $\quad$ $(p \wedge q) \vee r$

3. (12 points) How many truth assignments to the six sentence letters $p_1, \ldots, p_6$ satisfy the following schema?

$$(((((p_1 \oplus p_2) \oplus p_3) \oplus p_4) \oplus p_5) \oplus p_6)$$