PHL 245: Practice Test: Second Test
Focus on Units 4-6

UPCOMING TEST WILL BE (roughly):

40%: derivations 35%: symbolization 25%: concepts and truth-tables

A^1: *a* advertises.
B^1: *a* is a business
C^1: *a* is a store.
D^1: *a* has diamonds on it.
E^1: *a* is an engagement ring.
F^1: *a* is a person.
G^1: *a* is a restaurant
H^1: *a* stays in business.
L^2: *a* is displayed at *b*.
M^2: *a* is getting married to *b*.
N^2: *a* is more expensive than *b*.
O^3: *a* buys *b* from *c* (*c* sells *b* to *a*).

a^0: Tiffany's
b^0: Brian
c^0: Carol
d^1: the fiancé of *a*
e^1: the sister of *a*
b^2: the best man at the wedding of *a* and *b*.

1. Use the above symbolization scheme to symbolize the following sentences:
(There are more here for extra practice than will be on the second test.)

(a) Although stores and restaurants are businesses, not all businesses advertise.

(b) Assuming that people don't buy things from businesses that don't advertise, restaurants stay in business only if they do.

(c) In order for Carol's fiancé to get married to Carol, it is necessary that he buys an engagement ring from Tiffany's.

(d) Stores that display engagement rings sell things with diamonds on them to people.

(e) Everyone buys things from stores, but no store sells things to everyone.

(f) The only store that Brian buys an engagement ring from is Tiffany's.

(g) If anybody buys an engagement ring from a store then he/she is getting married to somebody.

(h) The best man at Carol and Brian's wedding is Carol's sister's fiancé.

(i) Give an idiomatic English translation of:

$\exists x(Cx \wedge \forall y(Cy \wedge x \neq y \rightarrow N(xy)) \wedge \forall z(L(zx) \rightarrow Dz))$.

(j) Disambiguate this ambiguous sentence by providing two symbolizations. For each, provide an English sentence that makes the meaning clear.

Everybody buys something from a store.

3. Use a full truth table to determine whether the following is a tautology, a contradiction or a contingent sentence. State which it is and briefly explain how you know.

$$P \rightarrow (Q \vee R) \wedge \sim(P \leftrightarrow Q)$$

4. Use a shortened truth-table of one line to show that the following argument is INVALID.

$$P \rightarrow Q \vee R. \ \ \sim(Q \leftrightarrow \sim S \wedge P). \quad \therefore\ P \rightarrow R.$$

5. Show that the following arguments are valid:

a) $\forall y(Fy \rightarrow \exists z(Jz \wedge Gz))$. $\exists x(Jx \vee Bx) \rightarrow \forall x\forall yH(xy)$. $\therefore \forall x(Fx \rightarrow \exists y(Gy \wedge H(xy)))$

b) $\exists x\forall y(H(xyy) \rightarrow \forall z{\sim}L(xz))$. $\forall x\forall y(Gx \rightarrow \exists zK(zy)) \rightarrow \forall x\exists y\forall zH(xyz)$.
$\forall x(\exists z(Gz \wedge {\sim}Mz) \rightarrow K(xx))$. $\therefore {\sim}\exists zMz \rightarrow {\sim}\forall yL(yy)$

c) $\exists x\forall yF(d(x)y\, d(y))$. $\exists xF(xxd(x)) \rightarrow \forall w\forall z{\sim}(A(wz) \leftrightarrow B(wz))$.

$\therefore\ {\sim}\forall x\exists yA(xy) \rightarrow {\sim}\forall x(A(xa) \vee {\sim}B(xx))$