Practice First Exam
Phi 321 Formal Logic
Fall 2015, Jared Bates

Part 1. Translations. Symbolize the following sentences in SL using the scheme of abbreviations provided. (10 pts each)

1. Neither Odysseus nor Nestor are Trojans, but Priam is the Trojan king. (O: Odysseus is a Trojan. N: Nestor is a Trojan. P: Priam is the Trojan king.)

2. Hector ascends to the throne only if he survives the war, the Achaeans are defeated, and he doesn't offend Apollo. (H: Hector ascends to the throne. H: Hector survives the war. D: The Achaeans are defeated. O: Hector offends Apollo.)

Part 2. Truth Tables. Construct full truth tables to answer the following questions. (10 pts each)

3. Is the following sentence truth-functionally true, false, or indeterminate?
   $\sim(N \supset \sim D) \equiv \sim(\sim D \vee \sim N)$

4. Is the following pair of sentences truth-functionally equivalent?
   $L \supset (R \supset N)$. $\sim N \supset (L \supset \sim R)$

5. Is the following argument truth-functionally valid? If not, indicate a counterexample.
   $\sim(S \vee \sim B)$. $B \supset (S \vee \sim C)$. $\therefore C \equiv B$

Part 3. Derivations. Demonstrate the validity of the following arguments by constructing derivations. (10 pts each)

6. $(S \,\&\, H) \vee (C \,\&\, \sim K)$. $K \supset \sim(S \,\&\, M)$. $\therefore K \supset \sim M$

7. $\therefore ((A \supset B) \supset A) \supset A$

8. $\sim(R \equiv L)$. $\therefore (R \,\&\, \sim L) \vee (L \,\&\, \sim R)$

Part 4. Combination. Translate the following argument into SL using the symbolization guide provided. If your symbolization is invalid, construct a full truth table for the argument and indicate at least one counterexample. If your symbolization is valid, demonstrate its validity by constructing a derivation. (20 pts)

9. If oranges contain citric acid so do lemons, or if lemons don't contain citric acid neither do grapefruit. Thus, if oranges and grapefruit contain citric acid, so do lemons. (O: Oranges contain citric acid. L: Lemons contain citric acid. G: Grapefruit contains citric acid.)