

# In Class Practice Logic Exam, Second Portion

Symbolic Logic 4040, Fall 2017

Name: \_\_\_\_\_

Instructions: Complete the following problems on this sheet.

Reminder: take your time and give full, complete, informative answers.

**A.** Give a complete truth table for the following sentences

1.  $\neg(A \wedge B)$
2.  $(P \leftrightarrow Q) \vee \neg Q$
3.  $\neg F \rightarrow R$

**B.** Use a truth table to explain whether the sentence  $\neg(W \leftrightarrow V) \rightarrow \neg(\neg W \vee V)$  is a tautology, a contradiction, or neither.

**C.** Use a truth table to explain whether the sentence the following argument in TFL is valid:

1.  $M \rightarrow (P \wedge \neg M)$
  2.  $\neg P$
- $\therefore M \vee P$

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**D.** For each of the following: (a) Is it a sentence of FOL, allowing for relaxed bracketing? (b) If not, state what the problem is.

1.  $\forall x(Mx \rightarrow Mt)$
2.  $Pa e$
3.  $\forall x \exists y(Pxy \rightarrow Ra)$
4.  $\forall x(Fx) \rightarrow Lax$
5.  $a = \neg b$

**E.** Using the following key, explain when the following FOL sentence is false:  
 $\exists z(Dz \wedge Laz)$

domain: all people

$Dx$ : \_\_\_\_\_ $x$  is dapper.

$Lxy$ : \_\_\_\_\_ $x$  loves \_\_\_\_\_ $y$ .

$a$ : Ashley

**F.** Give a symbolization key and symbolize the following sentences in FOL. (Remember: symbolization keys in FOL need domains, names, and predicates. Please keep all entries in the key in one place.)

1. Leslie is a tourist.
2. Susan is annoyed by tourists.
3. If no one annoys Leslie, she's a saint.
4. There are at least two saints.
5. Susan is annoyed by anyone who is annoyed by Leslie.