

## Philosophy 500 — Final exam, June 16

### Instructions:

1. You have the full 3 hours and 15 minutes for this exam. I recommend checking all your answers carefully in as many ways as you know how, until you're sure they're right. If you need more time, that's not a problem, just let me know at the end of class.
2. Read the instructions and all the questions carefully before writing anything. Answer all questions in the answer booklet and write your name on the front. A perfect score on this test is 100 points.
3. You should assume the following key for sections A and B of the exam:

UD: all animals	Tx: x is a tiger	Lxyz: x likes y better than z
a: Alyssa	Bx: x is a bird.	Axy: x is afraid of y.
b: Brad	Fx: x has feathers.	Cxy: x is cuter than y.
e: Ella	Hx: x is hairy.	Sxy: x has sniffed y.

A. Quantifier logic syntax: For each of the following, use the key above and write 'S' if it's both a proper sentence and a proper formula, 'F' if it's a proper formula but not a proper sentence, and 'N' if it's neither a proper formula nor a proper sentence. (10 points).

1.  $\forall y[Fy \rightarrow \exists x(Lyzx)]$
2.  $Tb \vee \exists y(Lxy \& Hy)$
3.  $\exists x[\forall y(Bx \& Fy \rightarrow Ayx)]$
4.  $Bb \& \forall z(\neg a = z \rightarrow Czz)$
5.  $\exists e[Be \rightarrow \forall x(Axe)]$
6.  $\exists x(Bx \& Fx) \rightarrow \forall y(Ty \rightarrow x \neg = a)$
7.  $\neg \exists x[Hx \& (Bx \vee Cax)]$
8.  $\forall y[\neg Hy \& \exists z(Fz \& Syz)]$
9.  $(He \& Sbb) \vee [\exists z(Bz \rightarrow Cz) \& Ta]$
10.  $\neg \forall y[Ayy \rightarrow \neg \exists z(Tz \& Lyzx)]$

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B. Quantifier logic translations: Translate each of the following using the key given. (48 pts).

1. Alyssa has sniffed every hairy bird.
2. Only tigers with feathers are cuter than Ella.
3. Brad and Ella are the only hairy birds.
4. No animal which has feathers is afraid of Ella.
5. Some hairy tiger is cuter than every bird it has sniffed.
6. Alyssa likes Ella better than every tiger, unless that tiger has feathers.
7. If any tiger is afraid of Ella, no bird is cuter than it.
8. Brad is afraid of no animals that don't have feathers.

C. Relating logical concepts: For each of the following, state whether it's true or false, and either explain **in full detail** why it's true or give an example to show that it's false.

**Note:** If you give an example which works, you will get full credit. On the other hand, if you give an example that doesn't work, it might be good to have something written about it to help me know what had in mind when I'm assigning any partial credit.

**Also:** Trying to explain why an example works might help you realize it doesn't work; and if you think the claim is true, trying to find a counterexample might help you realize it's actually false (if you find one). (42 points).

1. If  $A, B \therefore C$  is valid, then so is  $A \therefore B \rightarrow C$ .
2. If  $\{A, B, C\}$  is inconsistent, then the argument  $A \therefore \neg B \ \& \ \neg C$  is valid.
3. If  $A, B \therefore C$  is valid and  $C$  is false, then  $\{A, B\}$  is an inconsistent set.
4. If a valid argument has premises each of which is contingent, then its conclusion isn't a contradiction.
5. If  $A$  and  $B$  aren't logically equivalent and  $A \therefore B$  is valid, then  $B \therefore A$  is invalid.
6. If  $B \rightarrow C$  is contingent and so is  $A$ , then  $A, B \therefore C$  is invalid.

**Good luck!**

**Enjoy your summer!**