PRINT NAME:

LGIC 010 & PHIL 005
Practice Examination II
Spring Term, 2018

1. (13 points) Let S be a pure monadic schema containing occurrences of only the predicate letters F and G, and suppose that S has power 2^{10}. What is the minimum possible value of $|\mathsf{mod}(S, 4)|$?

2. (13 points) What is the length of the longest succinct list of pure monadic schemata containing occurrences of only the predicate letters F and G such that for every schema S on the list, $|\mathsf{mod}(S, 4)| = 28$?

3. Let S_1 be $(\forall x)\neg Lxx \wedge (\forall x)(\forall y)(\forall z)(Lxy \supset (Lyz \supset Lxz)) \wedge$ $(\forall x)(\forall y)(x \neq y \supset (Lxy \vee Lyx)) \wedge (\forall x)((\forall y)\neg Lyx \supset Fx)$.

   (a) (12 points) Specify a structure A_1 which is a member of $\mathsf{mod}(S_1, 4)$.

   $U^{A_1} =$

   $L^{A_1} =$

   $F^{A_1} =$

   (b) (12 points) How many structures are members of $\mathsf{mod}(S_1, 4)$?

4. Let S_2 be $(\forall x)(\exists y)Lxy$.

   (a) (12 points) Specify a structure A_2 which is a member of $\mathsf{mod}(S_2, 4)$.

   $U^{A_2} =$

   $L^{A_2} =$

   (b) (12 points) How many structures are members of $\mathsf{mod}(S_2, 4)$?

5. (13 points) Write down a schema S involving only the dyadic predicate letter "L," and the identity predicate such that

- $\mathsf{Spec}(S) = \{2n \mid n \in \mathbb{Z}^+\}$, and
- S implies
$$(\forall x)(\forall y)(Lxy \supset \neg Lyx).$$

6. (13 points) Let T be the conjunction of the following schemata.

- $(\forall x)(\forall y)(Lxy \supset Lyx)$
- $(\forall x)\neg Lxx$
- $(\forall x)(\exists y)(\exists z)(Lyz \wedge (\forall w)(Lxw \equiv (w = y \vee w = z)))$

Specify the spectrum of T.

$\mathsf{Spec}(T) =$