PRINT NAME:

LGIC 010 & PHIL 005
Practice Examination II
Spring Term, 2019

1. (10 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 maximum possible value of $|\mathsf{mod}(S, 4)|$?

2. (10 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, $|\mathsf{mod}(S, 4)| = 4$?

3. Let S_1 be $(\forall x)(\forall y)(Lxy \supset Lyx)$.

   (a) (10 points) Specify a structure A_1 which is a member of $\mathsf{mod}(S_1, 4)$.

   $U^{A_1} =$

   $L^{A_1} =$

   (b) (10 points) How many structures are members of $\mathsf{mod}(S_1, 4)$?

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

   (a) (10 points) Specify a structure A_2 which is a member of $\mathsf{mod}(S_2, 4)$.

   $U^{A_2} =$

   $L^{A_2} =$

   (b) (10 points) How many structures are members of $\mathsf{mod}(S_2, 4)$?

5. Let S_3 be the conjunction of the following schemata.

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

   (a) (10 points) Specify a structure A_3 which is a member of $\mathsf{mod}(S_3, 5)$.

   $U^{A_3} =$

   $L^{A_3} =$

   (b) (10 points) How many structures are members of $\mathsf{mod}(S_3, 5)$?

6. Let S_4 be the conjunction of the following schemata.

   - $(\forall x)\neg Lxx \wedge (\forall x)(\forall y)(Lxy \supset Lyx)$.
   - $(\forall x)(\exists y)Lxy \wedge (\forall x)(\forall y)(Lxy \supset (Fx \oplus Fy))$

   (a) (10 points) Specify a structure A_4 which is a member of $\mathsf{mod}(S_4, 5)$.

   $U^{A_4} =$

   $L^{A_4} =$

   $F^{A_4} =$

   (b) (10 points) How many structures are members of $\mathsf{mod}(S_4, 5)$?