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**Final Examination**  
**Philosophy 112**  
**Winter 2001**

Please work all the problems in the space provided. All problems are weighted equally. You may use only the rule set noted on the individual problems. Please be sure that you do everything that is asked for in each problem.

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1. Symbolize the following argument, revealing as much structure as possible and providing a symbolization key. Show that it is valid in *PD*.

No positive integer is greater than itself; given an positive integer, there is another that is greater. Therefore, there is no greatest positive integer.

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2. Symbolize the following argument, revealing as much structure as possible and providing a symbolization key. Using any semantical technique for *PL*, determine whether it is quantificationally valid or invalid and defend your answer.

Everything is the same as everything else. So, either everything is good, or nothing is.

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3. Using the definitions from the formal semantics, show that the following two sentences are quantificationally equivalent.

$$\begin{aligned} &(\exists x)Gx \\ &\sim(\forall x)\sim Gx. \end{aligned}$$

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4. Show that the following sentence is quantificationally indeterminate by constructing an interpretation on which it is true and one on which it is false. State why it is true and false on the two interpretations, respectively.

$$(\exists x)(\forall y)(\forall z)(x=z \vee y=z)$$

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5. Show that the following set of sentences is quantificationally consistent by constructing an appropriate expanded truth-table.

$\{(\forall y)(\exists x)\sim x=y, (\exists z)Faz, (\exists z)Fza\}$

6. Using the formal semantics for  $PL$ , determine the truth-value of the following sentence on the interpretation given. Show in detail how the truth-value is determined.

$$(\forall x)(Ex \supset (\exists y)Lyx)$$

UD:  $\{1,2\}$

E:  $\{\langle \mathbf{u} \rangle: \mathbf{u} \text{ is even}\}$

L:  $\{\langle \mathbf{u}_1, \mathbf{u}_2 \rangle: \mathbf{u}_1 \text{ is less than } \mathbf{u}_2\}$

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Prove that the following derivability relation holds in *PD*.

$\{(\forall x)(\exists y)[Ixy \ \& \ (\forall z)(Ix \supset z=x)], (\forall x)(\forall y)(Iyx \equiv Fyx)\} \vdash (\forall x)(\exists y)[Fyx \ \& \ (\forall z)(Fzy \supset z=y)]$