Name _____

Final Examination
Philosophy 134
Spring, 2005

1. Show, using the derivation rules for *S5D*, that the following derivability relation holds in *S5D*:

$\{\Diamond\Box A\} \vdash_{S5D} \Box\Diamond A$

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2. Show, using the semantical rules for *S4I*, that the following sentence is *S4I*-valid:

   $\vDash_{S4I} \Box A \supset (B \multimap \Box A)$

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3. Show, using the semantical rules for *S5I*, that the following semantical entailment fails in *S5I*:

$\{\Box\Diamond P\} \nvDash_{S5I} \Diamond\Box P$

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4. Using the derivational rules for *Q1D-S5*, show that the following sentence is a theorem of *Q1D-S5*:

$\vdash_{Q1D\text{-}S5} \sim\Box((\forall x)\Diamond\Box Fx \wedge (\exists x)\sim Fx))$

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5. Show, using the semantical rules for *QPLI-S4*, that the following entailment fails in *QPLI-S4*:

$\{(\forall x)\Diamond\Diamond Fx\} \nvDash_{QPLI\text{-}S4} \Diamond(\forall x)Fx$

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6. Consider a *Q1RI-D* interpretation I with the following characteristics:

   $W = \{w_1, w_2, w_3\}$

   $Rw_1w_2, Rw_2w_3, Rw_3w_1$

   $D=\{1, 2, 3\}, D^{w_1} = \{1, 3\}, D^{w_2} = \{1 , 2\}, D^{w_3} = \{2, 3\}$

   For all w_i $v_I(a, \mathbf{w}_i) = 3$

   $v_I(F,w_1)=\{\langle 1,2\rangle,\langle 2,3\rangle, \langle 3,1\rangle\}$, $v_I(F,w_2)=\{\langle 2,3\rangle, \langle 1,3\rangle\}$, $v_I(F,w_3)=\{\langle 1,2\rangle\}$

Evaluate the following sentence at each world. Show why you give it the truth-values that you do.

   $\Diamond(\forall x)Fxa$