PHI 201: Final Exam 2024

Instructions: You have three hours to complete the exam and upload your answers (unless you have a special accommodation). Please leave at least ten minutes of cushion in case of technical problems, and if problems persist, please email your answers immediately to your preceptor. You *may* use all notes, books, and even the internet during the exam. However, you may *not* discuss the exam with anyone else until you have both completed your exam and the exam window is over (midnight on Friday the 12th). Please write your honor code pledge on your exam.

1. Translate the following sentences into predicate logic. Use Sx for "x is a student", Px for "x is a professor", Rxy for "x respects y", and use the equality symbol "=" where relevant. You may assume that quantifiers range over people, so you don't need any additional symbol for "x is a person." [2 points each]

   (a) Any professor whom some students respect is respected by some professor.

   (b) There is someone who, although not him or herself a student, respects any student who respects no professor.

   (c) There is exactly one professor who respects only those students who respect him.

2. Prove the following sequents. You may use cut and/or replacement with any results, so long as you refer to a fully rigorous proof (e.g. in textbook or a previous pset). [4 points each]

   (a) $(\forall xFx \to \forall xGx) \to \forall xFx \vdash \forall xFx$

   (b) $\forall x\forall y\forall z(Rxy \to \neg Ryz) \vdash \exists y\forall x\neg Rxy$

3. Provide *two* interpretations to show that the following sentence is a contingency. [4 points]

$$\forall x(Fx \to Gx) \lor \forall x(Gx \to Fx)$$

4. Can there be a correctly written proof with the following line fragments? Justify your answer by reference to the existence (or non-existence) of relevant interpretations, and by citing soundness or completeness. [4 points]

1	(1)	$\forall y\exists xRxy$	A
	$\vdots$		
1	(n)	$\exists x\exists y(Rxy \land Ryx)$	