Phi 270 F97 part of quiz 4 and all of quiz 5 (of 6)

(questions from these two tests addressed the part of the course your test is designed to cover)

4-4. Identify individual terms and quantifier phrases in the following sentence and indicate links between pronouns and their antecedents. (You can do this by marking up an English sentence; you are *not* being asked to provide a symbolic analysis.)

Everyone who Carol lent the book to spoke to her at length about it.

[answer]

Analyze the following generalizations in as much detail as possible. Provide a key to the non-logical vocabulary (upper and lower case letters) appearing in your answer *and restate the result using an unrestricted quantifier*.

4-5. *Bob called no one*.

[answer]

4-6. *Among contestants, only professionals were finalists*.

[answer]

Analyze the following sentences in as much detail as possible, providing a key to the non-logical vocabulary (upper and lower case letters) appearing in your answer.

5-1. *Bob doesn't own any map showing Dafter*.

[answer]

5-2. *Nothing anyone said bothered Dave*.

[answer]

Use derivations to establish the validity of the following arguments. You may use attachment rules.

5-3.
$$\frac{\forall x\,(Fx \wedge Gx)}{\forall x\,Fx}$$

[answer]

5-4.
$$\frac{(\forall x\text{: } Rxa)\ \forall y\ Rxy}{(\forall x\text{: } \forall y\ Rxy)\ Rxb}$$

[answer]

5-5. Use a derivation to show that the following argument is not valid and describe a structure dividing one of the derivation's open gaps. (You will *not* need the rules UG+, RUG+, and ST of §7.8 that were designed to avoid unending derivations.)

$$\frac{(\forall x\text{: } Fx)\ Rax}{(\forall x\text{: } Fx)\ Rxa}$$

[answer]

You will receive credit for *one* of the following (but you may attempt both):

5-6a. Synthesize an English sentence whose analysis would yield the

following form.

(∀x: Dx) (Okx → (∀y: Dy) Oky)

[D: λx (x *is a door*); O: λxy (x *opens* y); k: *the key*]

[answer]

5-6b. Use derivations to establish the validity of the following argument. You may use attachment rules.

∀x (∀y: Rxy) ¬ Fy

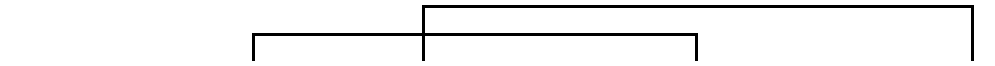
(∀x: Fx) Rxx

∀x ¬ Fx

[answer]

Phi 270 F97 Answers to part of quiz 4 and all of quiz 5

4-4.



Everyone who Carol lent the book to spoke to her at length about it

Q T T

4-5. *Bob called no one*
no one is such that (Bob called him or her)
(∀x: x *is an person*) ¬ *Bob called* x
(∀x: Px) ¬ Cbx
∀x (Px → ¬ Cbx)
[C: λxy (x *called* y); P: λx (x *is person*); b: *Bob*]

4-6. *Among contestants, only professionals were finalists*
Among contestants, only professionals are such that (they were finalists)
(∀x: x *was a contestant* ∧ ¬ x *was a professional*) ¬ x *was a finalist*
(∀x: Cx ∧ ¬ Px) ¬ Fx
∀x ((Cx ∧ ¬ Px) → ¬ Fx)
[C: λx (x *was a contestant*); F: λx (x *was a finalist*); P: λx (x *was a professional*)]

5-1. *Bob doesn't own any map showing Dafter*
every map showing Dafter is such that (Bob doesn't own it)
(∀x: x *is a map showing Dafter*) ¬ *Bob owns* x
(∀x: x *is a map* ∧ x *shows Dafter*) ¬ Obx
(∀x: Mx ∧ Sxd) ¬ Obx
[M: λx (x *is a map*); O: λxy (x *owns* y); S: λxy (x *shows* y); b: *Bob*; d: *Dafter*]

5-2. *Nothing anyone said bothered Dave*
everyone is such that (nothing he or she said bothered Dave)
(∀x: x *is a person*) *nothing* x *said bothered Dave*
(∀x: Px) *nothing* x *said is such that (it bothered Dave)*
(∀x: Px) (∀y: y *is a thing* x *said*) ¬ y *bothered Dave*
(∀x: Px) (∀y: x *said* y) ¬ Byd

(∀x: Px) (∀y: Sxy) ¬ Byd

[B: λxy (x *bothered* y); P: λx (x *is a person*); S: λxy (x *said* y); d: *Dave*]

5-3.

	∀x (Fx ∧ Gx)	a:2
	ⓐ	
2 UI	Fa ∧ Ga	3
3 Ext	Fa	
3 Ext	Ga	(4)
	•	
4 QED	Fa	1
1 UG	∀x Fx	

5-4.

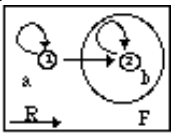
	(∀x: Rxa) ∀y Rxy			(∀x: Rxa) ∀y Ryx	c:3
	ⓒ			ⓒ	
	∀y Rcy	a:2		∀y Rcy	a:2
2 UI	Rcb	(3)	2 UI	Rca	(3)
	•		3 SB	∀y Ryc	b:4
			4 UI	Rbc	(5)
3 QED	Rcb	1		•	
1 RUG	(∀x: ∀y Rxy) Rxb		5 QED	Rbc	1
			1 RUG	(∀x: ∀y Rxy) Rbx	

[The first premise is never used in the derivation for this question (shown at the left). This was a slip on my part in making up the question; at the right is the sort of example I apparently had in mind.]

5-5.

	(∀x: Fx) Rax	b:2,a:4
	ⓑ	
	Fb	(2)
2 SB	Rab	
	¬ Rba	
	¬ Fa	
	○	Fb, Rab, ¬ Rba, ¬ Fa ⇏ ⊥
	⊥	5
5 IP	Fa	4
	Raa	
	○	Fb, Rab, ¬ Rba, Raa ⇏ ⊥
	⊥	4
4 MCR	⊥	3
3 IP	Rba	1
1 RUG	(∀x: Fx) Rxa	

The structure below divides both gaps; it will continue to divide the first gap when the arrow from 1 to itself is dropped.



5-6a. (∀x: x *is a door*) (*the key opens* x → (∀y: y *is a door*) *the key opens* y)

(∀x: x *is a door*) (*the key opens* x → *every door is such that (the key opens it)*)

(∀x: x *is a door*) (*the key opens* x → *the key opens every door*)

(∀x: x *is a door*) *if the key opens* x*, then it opens every door*

every door is such that (if the key opens it, then it opens every door)

If the key opens any door, then it opens every door

5-6b.

	∀x (∀y:Rxy) ¬ Fy	a:2
	(∀x:Fx) Rxx	a:4
	ⓐ	
2 UI	(∀y:Ray) ¬ Fy	a:5
	Fa	(4), (6)
4 SB	Raa	(5)
5 SB	¬ Fa	(6)
	•	
6 Nc	⊥	3
3 RAA	¬ Fa	1
1 UG	∀x ¬ Fx	