Phi 270 F99 test 4

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.

1. *Sam invited every vertebrate to the party, but only people accepted his invitation*
[answer]

2. *Tom didn't send anything to the printer*
[answer]

3. *No game that every child liked was complete*
[answer]

Synthesize an English sentence whose analysis would yield the following form.

4. (∀x: Px) (∀y: Ry ∧ Txy) Sy
[P: λx (x *is a person*); R: λx (x *is a room*); S: λx (x *was reserved*); T: λxy (x *thought of* y)]
[answer]

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

5.
$$\frac{\forall x\ (Fx \rightarrow Gx)}{\forall x\ Fx \rightarrow \forall x\ Gx}$$
[answer]

6.
$$\frac{\forall x\ (\forall y\text{: } Fyx) \neg Py}{(\forall x\text{: } Px)\ \forall y \neg Fxy}$$
[answer]

7. Use a derivation to show that the following argument is not valid and describe a structure (by using either a diagram or tables) that divides one of the derivation's open gaps.

$$\frac{\forall x\ (\forall y\text{: } Fy) \neg Rxy \qquad \forall x\ Rxx}{\forall x\ \forall y \neg Rxy}$$

[answer]

Phi 270 F99 test 3 answers

1. *Sam invited every vertebrate to the party, but only people accepted his invitation*

Sam invited every vertebrate to the party ∧ *only people accepted Sam's invitation*

every vertebrate is such that (Sam invited it to the party) ∧ *only people are such that (they accepted Sam's invitation)*

(∀x: x *is a vertebrate*) *Sam invited* x *to the party* ∧ (∀x:¬ x *is a person*) ¬ x *accepted Sam's invitation*

(∀x: Vx) Isxp ∧ (∀x:¬ Px) ¬ Ax(*Sam's invitation*)

(∀x: Vx) Isxp ∧ (∀x: ¬ Px) ¬ Ax(is)

[A: λxy (x *accepted* y); I: λxyz (x *invited* y *to* z); P: λx (x *is a person*); V: λx (x *is a vertebrate*); i: λx (x *'s invitation*); p: *the party*; s: *Sam*]

2. *Tom didn't send anything to the printer*

everything is such that (Tom didn't send it to the printer)

∀x *Tom didn't send* x *to the printer*

∀x ¬ *Tom sent* x *to the printer*

∀x ¬ Stxp

[S: λxyz (x *sent* y *to* z); p: *the printer*; t: *Tom*]

3. *No game that every child liked was complete*

No game that every child liked is such that (it was complete)

(∀x: x *was a game that every child liked*) ¬ x *was complete*

(∀x: x *was a game* ∧ *every child liked* x) ¬ Cx

(∀x: x *was a game* ∧ *every child is such that (he or she liked* x)) ¬ Cx

(∀x: Gx ∧ (∀y: y *was a child*) y *liked* x) ¬ Cx

(∀x: Gx ∧ (∀y: Dy) Lyx) ¬ Cx

[C: λx (x *was complete*); D: λx (x *was a child*); G: λx (x *was a game*); L: λxy (x *liked* y)]

4. (∀x: x *is a person*) (∀y: y *is a room* ∧ x *thought of* y) y *was reserved*

(∀x: x *is a person*) (∀y: y *is a room* x *thought of*) y *was reserved*

(∀x: x *is a person*) *every room* x *thought of was such that (it was reserved*)

(∀x: x *is a person*) *every room* x *thought of was reserved*

everyone is such that (every room he or she thought of was reserved)

every room anyone thought of was reserved

5.

	∀x (Fx → Gx)	a:3
	∀x Fx	a:4
	ⓐ	
3 UI	Fa → Ga	5
4 UI	Fa	(5)
5 MPP	Ga	(6)
	•	
6 QED	Ga	2
2 UG	∀x Gx	1
1 CP	∀x Fx → ∀x Gx	

6.

	∀x (∀y: Fyx) ¬ Py	b:4
	ⓐ	
	Pa	(6)
	ⓑ	
	Fab	(5)
4 UI	(∀y: Fyb) ¬ Py	a:5
5 SB	¬ Pa	(6)
	•	
6 Nc	⊥	3
3 RAA	¬ Fab	2
2 UG	∀y ¬ Fay	1
1 RUG	(∀x: Px) ∀y ¬ Fxy	

7.

	∀x (∀y: Fy) ¬ Rxy	a:4,b:5
	∀x Rxx	a:6,b:7
	ⓐ	
	ⓑ	
	Rab	(9)
4 UI	(∀y: Fy) ¬ Ray	a:8,b:9
5 UI	(∀y: Fy) ¬ Rby	b:10,a:11
6 UI	Raa	(8)
7 UI	Rbb	(10)
8 SC	¬ Fa	
9 SC	¬ Fb	
10 SC	¬ Fb	
	¬ Fa	
	○	¬Fa,¬Fb,Rab,Raa,Rbb ⇏ ⊥
	⊥	
	Fa	11
	¬ Rba	
	○	¬Fa,¬Fb,Rab,Raa,Rbb,¬Rba ⇏ ⊥
	⊥	11
11 MCR	⊥	3
3 RAA	¬ Rab	2
2 UI	∀y ¬ Ray	1
1 UI	∀x ∀y ¬ Rxy	

The structure below divides both gaps