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: [_ is a person]; R: [_ is a room]; S: [_ was reserved]; T: [_ thought of _]
   answer

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

5. ∀x (Fx → Gx)

   ∀x Fx → ∀x Gx
   answer

6. ∀x ∀y (Fyx → ¬ Py)

   ∀x (Px → ∀y ¬ 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.

   ∀x ∀y (Fy → ¬ Rxy)
   ∀x Rxx

   ∀x ∀y ¬ Rxy
   answer

Phi 270 F99 test 4 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: x̲ is a vertebrate) S̲am invited x̲ to t̲h̲e̲ p̲a̲r̲t̲y̲ ∧ (∀x:¬ x̲ is a
    person) ¬ x̲ accepted S̲a̲m̲'s̲ i̲n̲v̲i̲t̲a̲t̲i̲o̲n̲
    (∀x: Vx) Isxp ∧ (∀x:¬ Px) ¬ Ax(Sam's invitation)
                         (∀x: Vx) Isxp ∧ (∀x: ¬ Px) ¬ Ax(is)
    A: [_ accepted _]; I: [_ invited _ to _]; P: [_ is a person];
    V: [_ is a vertebrate]; i: [_ '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 ¬ T̲o̲m̲ sent x̲ to t̲h̲e̲ p̲r̲i̲n̲t̲e̲r̲
                       ∀x ¬ Stxp
    S: [_ sent _ to _]; 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: [_ was complete]; D: [_ was a child]; G: [_ was a game];
    L: [_ liked _]

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.

$\forall x\,(Fx \rightarrow Gx)$ a:3

  $\forall x\,Fx$ a:4

  (a)

3 UI $Fa \rightarrow Ga$ 5
4 UI Fa (5)
5 MPP Ga (6)
        ●

6 QED Ga 2

2 UG $\forall x\,Gx$ 1

1 CP $\forall x\,Fx \rightarrow \forall x\,Gx$

6.

$\forall x\,\forall y\,(Fyx \rightarrow \neg Py)$ b:5

(a)

  Pa (8)

  (b)

    Fab (7)

5 UI $\forall y\,(Fyb \rightarrow \neg Py)$ a:6
6 UI $Fab \rightarrow \neg Pa$ 7
7 MPP $\neg Pa$ (8)
        ●

8 Nc $\bot$ 4

4 RAA $\neg Fab$ 3

3 UG $\forall y\,\neg Fay$ 2

2 CP $Pa \rightarrow \forall y\,\neg Fay$ 1

1 UG $\forall x\,(Px \rightarrow \forall y\,\neg Fxy)$

7.

	$\forall x\,\forall y\,(Fy \rightarrow \neg\,Rxy)$	a:4,b:5
	$\forall x\,Rxx$	a:6,b:7

    ⓐ
      ⓑ

	Rab	(11)
4 UI	$\forall y\,(Fy \rightarrow \neg\,Ray)$	a:8, b:9
5 UI	$\forall y\,(Fy \rightarrow \neg\,Rby)$	a:12, b:13
6 UI	Raa	(10)
7 UI	Rbb	(14)
8 UI	$Fa \rightarrow \neg\,Raa$	10
9 UI	$Fb \rightarrow \neg\,Rab$	11
10 MTT	$\neg\,Fa$	
11 MTT	$\neg\,Fb$	
12 UI	$Fa \rightarrow \neg\,Rba$	15
13 UI	$Fb \rightarrow \neg\,Rbb$	14
14 MTT	$\neg\,Fb$	

	$\neg\,Fa$	
	○	$\neg Fa, \neg Fb, Rab, Raa, Rbb \nRightarrow \bot$
	$\bot$	16
16 IP	Fa	15

	$\neg\,Rba$	
	○	$\neg Fa, \neg Fb, Rab, Raa, Rbb, \neg Rba \nRightarrow \bot$
	$\bot$	15
15 RC	$\bot$	3
3 RAA	$\neg\,Rab$	2
2 UI	$\forall y\,\neg\,Ray$	1
1 UI	$\forall x\,\forall y\,\neg\,Rxy$	

The structure below divides both gaps