2.5 I)

$P \wedge (P \to Q) \to Q$

$t_4 \quad t_2 \quad ? \quad t_5 \quad F_3 \quad F \quad F_1$

Olivier Berg

For the sake of completeness add columns for P | Q | just to be more formally accurate

II)

$\neg Q \wedge (P \to Q) \to \neg P$

$t_4 F_5 \cancel{F_3 t_3}$? $t_6 F_7$ F Tekst $F_1 t_2$

T

III)

$P \vee \neg P$

$F_1 \quad F \quad F_2 \quad ?$

IV)

$\neg(P \wedge \neg P)$

$F \quad t_2 \quad t_1 \quad t_3 \quad ?$

V)

$(\neg P \to P) \to P$

$F_4 \quad ? \quad t_2 \quad F_3 \quad F \quad F_1$

VI)

$(P \to Q) \wedge (\neg P \to Q) \to Q$

$F_7 \quad t_3 \quad F_6 \quad t_2 \quad F_8 \quad ? \quad t_4 \quad F_5 \quad F \quad F_1$

VII)

	$\neg(P \wedge Q) \leftrightarrow (\neg P \vee \neg Q)$
1	$\underline{t_1}$? F_3 t_8 F F_4 t_6 $\underline{F_2}$ F_5 t_7
2	$\underline{F_1}$ t_5 t_3 t_4 F F_7 t_6 $\underline{t_2}$ t_8 ?

VIII)

	$\neg(P \vee Q) \leftrightarrow (\neg P \wedge \neg Q)$
1	t_1 F_4 F_3 F_5 F t_7 F_6 F_2 F_8 ?
2	F_1 ? t_3 F_9 F t_4 F_6 t_2 t_5 F_7

IX)

$P \wedge \neg P \rightarrow Q$
t_3 t_2 t_4 ? F F_1

2.6

I)

P	$P \wedge P$
F	F_1 F F_2
t	t_1 t t_2

→ Contingency

II)

	P Q R	$((P \rightarrow Q) \rightarrow R) \leftrightarrow (P \rightarrow (Q \rightarrow R))$
1.1 1.2	t t F	t_9 t_4 t_{10} F_1 F_3 t F_7 F_2 t_8 t_6 F_5
2.1		F_8 ? t_1 F_7 F t_3 F_2 t_6 F_4 F_5
2.21		t_9 t_4 ? F_1 F_3 F t_6 t_2 F_8 t_7 F_5
2.22	F F F	F_9 t_4 F_{10} F_1 F_3 F F_6 t_2 F_8 t_7 F_5

→ Contingency

III) (I won't do a partial because I'll need to do a lot of assumptions)

P	Q	R	$(P \leftrightarrow (Q \leftrightarrow R)) \leftrightarrow ((P \leftrightarrow Q) \leftrightarrow R)$				
T	T	T	T	T	T	T	T
T	T	F	F	F	T	T	F
T	F	T	F	F	T	F	F
T	F	F	T	T	T	F	T
F	T	T	F	T	T	F	F
F	T	F	T	F	T	F	T
F	F	T	T	F	T	T	T
F	F	F	F	T	T	T	F

→ tautology

IV

	P Q	$\neg(P \to Q) \leftrightarrow (P \wedge \neg Q)$								
1.1	T F	T_1	T_5	F_3	F_4	T	T_6	T_2	T_7	F_8
1.2										
2.1		T_1	T_5	F_3	F_4	F	T_6	F_2	F_7	?
2.2		F_1	?	T_3	F_7	F	T_4	T_2	T_5	F_6

→ tautology

(2.7)

III) $|\phi \vee \psi|_A = F$ iff $|\phi|_A = F$ and $|\psi|_A = F$

IV) $|\phi \to \psi|_A = F$ iff $|\phi|_A = t$ and $|\psi|_A = F$

V) $|\phi \leftrightarrow \psi|_A = F$ iff $|\phi|_A \neq |\psi|_A$

(2.8) According to definition 2.9 $I \models \phi$ iff there is no $\mathcal{L}_1$-Structure in which all sentences ~~are true~~ in I are true and ϕ is false.

According to definition 2.11 a set of sentences is consistent iff there is an $\mathcal{L}_1$-Structure under which all sentences in the structure are true.

~~If~~ So, if a set is inconsistent there is no $\mathcal{L}_1$-Structure under which all sentences in that set are true.

If the set containing all sentences in I and $\neg\phi$ is inconsistent then there is no counterexample as in definition 2.10. therefore, the argument must be valid.

Answer: $\Gamma \models \varphi$ iff there is not $\mathcal{L}_1$-Structure where Γ all true and φ false

iff ~~that~~ there is no $\mathcal{L}_1$-Structure in which $\neg\varphi$ and all Γ are true

iff the set containing $\neg\varphi$ and all in Γ ~~are~~ is inconsistent

(7)

A: Jones arrives at the airport after the scheduled departure time

W: the plane will wait for Jones

N: nobody notices that ...

the argument being made is:

$$\begin{array}{l|l} & A \to W \ \therefore\ (A \wedge N) \to W \\ \hline & ?\ t\ F_5 \qquad t_3\ t_1\ t_4\ F\ F_2 \end{array}$$

there is no counterexample so the argument seems valid. However, you could argue that the plane will ofcourse only wait for Jones (i.e. an implicit assumption) if they ~~bez~~ know that he is late, so you could argue that the argument should actually be formalised the following way:

$$\begin{array}{l|l} & (A \wedge \neg N) \to W \ \therefore\ (A \wedge N) \to W \\ \hline & t_5\ F_8\ F_7\ t_6\ t\ F_9 \qquad t_3\ t_2\ t_4\ F\ F_1 \end{array}$$

So in this case there is a counterexample and so the argument is not valid.

this, however, does not have to be the case, there could be some other ~~Rea~~ mechanism ~~Mecha nism~~ that will cause the plain to wait ~~th~~ which does not require anyone to know that Jones is late. So, in my opinion we should apply the Principle of charity and assume the latter.

(33)

I)

A	Robin believes that A
T	?
F	?

II)

A	Robin knows that A
T	?
F	F → however, this depends on your defenition of what it means to know something

III)

A	Robin knows that A, but it's not true that A
T	F → this is false because we just said that if something is not true, one cannot know it
F	F

Could be done as

A	(Robin knows that	A	$\wedge$	$\neg$ A)
T	?	T	F	F T
F	F	F	F	T F

~~That How can you get different results?~~
~~that is because in this case, Robin would never~~
~~You could argue here that there should not be a question mark because in the event of A being true there is~~
a contradiction because

It is a contradiction, Robin would never believe A if A is false so both statements can't be true at the same time.

~~3/3~~ IV)

A	the infallable Clairvoyant Believes that A
T	?
F	F

this depends on the definition of "Believing".
If you say that it is impossible to Believe something without having thought about it, the first row is a "?".

Clairvoyant could be a name

V)

A	B	A, But B
T	T	T
T	F	F
F	T	F
F	F	F

Same as ∧

A B	Suppose A; then B
T T	T
T F	F
F T	?
F F	?

It behaves the same way as an if-statement (that is not the same as the truth table for ~~the~~ ~~[illegible]~~ →).
Just like with the if, it is not truth functional in the case that the antecedent is false (counterfactual).

two examples:

- Suppose Giovanni did not go to London, then he would not have gotten ill.

$\neg L$

$\neg I$

imagine the case that Giovanni did go to London (¬L), but did not get sick (¬I) (this is row FT) it is ambiguous whether the sentence is true or false.

- 1. Suppose Kamala Harris would have won the election, then she would have been president
2. Suppose Kamala Harris would have won the election, then aliens would have attacked the earth.

Both of these are row 2 FF (Kamala did not win and the latter did not happen), It is ambiguous whether the 2nd sentence would be true or false.

Also "Suppose ..." is an imperitive sentence, and not declarative, so one could argue that all the values in the truth table are "?"s.

3.6

S : many students will be in Schopenhauer's lectures

H : " Hegel's "

t : they are scheduled at the same time

E_1 : Hegel's lectures are entertaining

E_2 : Schopenhauer's "

Good. Will go over this in class, can discuss then

Initially you'd think it is formalised like this:

$$t \to (H \vee S),\ t,\ E_1 \to H,\ E_2 \to E_1,\ S \to E_2\ \therefore\ H \wedge \neg S$$

$S\,H\,t\,E_1\,E_2$	$t \to (H \vee S)$	t	$E_1 \to H$	$E_2 \to E_1$	$S \to E_2$	$H \wedge \neg S$
t t t t t	t_1 t t_3 t_2 t_4	t	t_{13} t t_5	t_{11} t t_{12}	t_6 t t_7	t_8 F F_{10} t_9

So there is a counterexample,

then

However, "many students come to Schopenhauer's lectures or Hegel's lectures" ~~[illegible]~~ ~~should~~ Could be interpreted as an exclusive or, ~~[illegible] should~~ ~~[illegible] that the students~~ that there could not be many students ~~on~~ in both lectures:

	$t \to ((H \vee S) \wedge \neg(H \wedge S))$	t	$E_1 \to H$	$E_2 \to E_1$	$S \to E_2$	$H \wedge \neg S$
1	t_1 t $\underline{t_6}$ t_3 $\underline{F_7}$ t_2 t_4 $\underline{t_8}$ F_5 $\underline{F_9}$	t	t t_{10}	t	F_{11} t	t_{12} F F_{13} ?
2	t_1 t $\underline{F_6}$ t_3 $\underline{t_7}$ t_2 t_4 $\underline{F_8}$ F_5 $\underline{t_9}$	t	F_{11} t F_{10}	F_{13} t F_{12}	? t F_{13}	F

You only have to check these two because there are only two ways for an XOR to be true.
So there are no counterexamples, so the assumption makes the argument valid ✓

→ truth table:

A	B	A XOR B
t	t	F
t	F	t
F	t	t
F	F	F

→ So only two ways for it to be true.