TEST1

FULL NAME: GROUP:

- a) Give derivations that prove the following sequents:

 1) $\{(\phi \rightarrow \Psi), (\phi \rightarrow (1\Psi))\} \vdash (7\phi)$ 2) $\{(\phi \rightarrow (\Psi \rightarrow X))\} \vdash (\Psi \rightarrow (\phi \rightarrow X))$
 - 3) $\{((x \wedge \theta) \rightarrow (1\phi)), (y \rightarrow \phi), y, \theta\} \leftarrow (1x)$
- b) Assume that the sequents $\Gamma + \psi$ and $\Delta + \phi$ are correct. Is the sequent $\Gamma \cup \Delta + (X \rightarrow (\phi \wedge \psi))$ correct? Justify your answer.

a) 1) $\phi^{\bullet}(\phi \rightarrow \Psi)_{(\gamma E)} \phi^{\bullet}(\phi \rightarrow (1\Psi))$ (γE) Ψ (1Ψ)	a) 1) $\phi^{0}(\phi \rightarrow \Psi)_{(SE)} \phi^{0}(\phi \rightarrow (7\Psi))_{(SE)}$
2) $\int (\phi \rightarrow (\Psi \rightarrow \chi)) (\rightarrow E)$ $(\psi \rightarrow \chi) (\rightarrow$	Y (74)
2) $\phi = (\phi \rightarrow (\psi \rightarrow \chi)) (\rightarrow E)$ $\psi = (\psi \rightarrow \chi) (\rightarrow E)$	(7I)
$\frac{\mathcal{X}^{\oplus} \theta (\Lambda I)}{\Psi (\Psi \rightarrow \emptyset)} \xrightarrow{(+)} \frac{(\chi \Lambda \theta)}{(\chi \Lambda \theta)} \xrightarrow{(+)} (\chi \Lambda \theta$	2) $\phi^{\circ}(\phi \to (\Psi \to \chi)) (\to E)$
$\frac{\mathcal{X}^{\oplus} \theta (\Lambda I)}{\Psi (\Psi \rightarrow \emptyset)} \xrightarrow{(+)} \frac{(\chi \Lambda \theta)}{(\chi \Lambda \theta)} \xrightarrow{(+)} (\chi \Lambda \theta$	$\frac{\sqrt{\chi}}{(\phi \to \chi)} (\to I)$
$\frac{\mathcal{X}^{\oplus} \theta_{(\Lambda I)}}{\mathcal{Y}} \frac{(\mathcal{Y} \wedge \theta)}{(\mathcal{Y} \wedge \theta)} \frac{(\mathcal{Y} \wedge \theta)}{$	$(Y \rightarrow (\phi \rightarrow \chi))$
(7I) (7X) b) Assume that the sequents $\Gamma \mapsto \Psi$ and $\Delta \mapsto \emptyset$ are correct. Then there exist two derivations Ψ and Ψ whose conclusion is Ψ (resp. \emptyset) and whose undischarged assumptions are all in the set Γ (resp. Δ). So we can deduce the following derivation $ \begin{array}{cccccccccccccccccccccccccccccccccc$	$\chi \circ \theta_{(\Lambda I)}$
(7I) (7X) b) Assume that the sequents $\Gamma \mapsto \Psi$ and $\Delta \mapsto \phi$ are correct. Then there exist two derivations Ψ and Ψ whose conclusion is Ψ (resp. ϕ) and whose undischarged assumptions are all in the set Γ (resp. Δ). So we can deduce the following derivation $ \begin{array}{cccccccccccccccccccccccccccccccccc$	$\frac{\Psi (\Psi \rightarrow \phi)}{\phi} (\rightarrow E) \frac{(\chi \wedge \theta) ((\chi \wedge \theta) \rightarrow (\tau \phi))}{(\tau \phi) (\tau E)} (\rightarrow E)$
b) Assume that the sequents $\Gamma \vdash \Psi$ and $\Delta \vdash \phi$ are correct. Then there exist two derivations Ψ and Ψ' whose conclusion is Ψ (resp. ϕ) and whose undischarged assumptions are all in the set Γ (resp. Δ). So we can deduce the following derivation $\frac{D'}{\Psi} = \frac{D}{\Psi}(\Lambda I)$ ($(A \rightarrow (A \rightarrow \Psi))$) and whose undischarged assumptions are all in the set $\Gamma \cup \Delta$. The less constraints are all in the set $\Gamma \cup \Delta$.	Ω^{\perp} (11)
b) Assume that the sequents $\Gamma \vdash \Psi$ and $\Delta \vdash \phi$ are correct. Then there exist two derivations Ψ and Ψ' whose conclusion is Ψ (resp. ϕ) and whose undischarged assumptions are all in the set Γ (resp. Δ). So we can deduce the following derivation $\frac{D'}{\Psi} = \frac{D}{\Psi}(\Lambda I)$ ($(A \rightarrow (A \rightarrow \Psi))$) and whose undischarged assumptions are all in the set $\Gamma \cup \Delta$. The less constraints are all in the set $\Gamma \cup \Delta$.	(7χ)
whose conclusion is Ψ (resp. ϕ) and whose undischarged assumptions are all in the set Γ (resp. Δ). So we can deduce the following derivation $\frac{D'}{\phi} \qquad \frac{D'}{\Psi(\Lambda I)} \qquad \frac{(\phi_{\Lambda} \Psi)}{(\chi \to (\phi_{\Lambda} \Psi))} (\to I)$ whose conclusion is $(\chi \to (\phi_{\Lambda} \Psi))$ and whose undischarged assumptions are all in the set $\Gamma \cup \Delta$ The second second conclusion as $(\chi \to (\phi_{\Lambda} \Psi))$ and $(\chi \to (\phi_{\Lambda} \Psi))$	b) Assume that the sequents $\Gamma \vdash \Psi$ and $\Delta \vdash \phi$ are correct. Then there exist two derivations D_{α} and D_{α}
Can deduce the following desiration $ \frac{D'}{\phi} \qquad \frac{D'}{\psi(\Lambda I)} $ $ \frac{(\phi \wedge \psi)}{(\chi \to (\phi \wedge \psi))} (\to I) $ whose conclusion is $(\chi \to (\phi \wedge \psi))$ and whose undischarged assumptions are all in the set $\Gamma \cup \Delta$ The least	whose conclusion is 4 (resp. \$\phi) and whose undischarged
$\frac{D'}{\phi} \frac{D}{\Psi(\Lambda I)}$ $\frac{(\phi \Lambda \Psi)}{(\chi \to (\phi \Lambda \Psi))} (\to I)$ whose conclusion is $(\chi \to (\phi \Lambda \Psi))$ and whose undischarged assumptions are all in the set $\Gamma U \Delta$ The last	wishing hours will all in the set ! (Tesp. (). So we
$\frac{(\varphi \wedge \psi)}{(\chi \to (\varphi \wedge \psi))} (\to I)$ whose conclusion is $(\chi \to (\varphi \wedge \psi))$ and whose undischarged assumptions are all in the set $\Gamma \cup \Delta$. It has	\mathcal{D}' \mathcal{D} \mathcal{A}
whose conclusion is $(\chi \rightarrow (\phi \wedge \psi))$ and whose undischarged assumptions are all in the set $\Gamma \cup \Delta$ The second seco	$(\phi \wedge \psi)$ $(\rightarrow I)$
The are in the set I I A The sea	whose conclusion is $(x \rightarrow (\phi \land \psi))$
that the sequent $\Gamma \cup \Delta \vdash (X \rightarrow (\emptyset \land \Psi))$ is correct.	assumptions are all in the Time and whose undischarged
	that the sequent $\Gamma \cup \Delta \vdash (X \rightarrow (\emptyset \land \Psi))$ is correct.