

Written Test
Duration 45min

Exercise 1: (3 points)

For each proposition, verify whether it is valid or not (Justify your answer) :

1. If $\alpha_1, \alpha_2, \dots, \alpha_n \models \beta \wedge \delta$ then $\alpha_1, \alpha_2, \dots, \alpha_n \models \beta$ and $\alpha_1, \alpha_2, \dots, \alpha_n \models \delta$
2. If $\alpha_1, \alpha_2, \dots, \alpha_n \models \beta \vee \delta$ then $\alpha_1, \alpha_2, \dots, \alpha_n \models \beta$ or $\alpha_1, \alpha_2, \dots, \alpha_n \models \delta$
3. $\alpha_1, \alpha_2, \dots, \alpha_n \models \beta \vee \delta$ iff $\alpha_1, \alpha_2, \dots, \alpha_n, \neg \beta \models \delta$

Exercise 2 (6 points) Verify the following logical consequences:

1. $P \rightarrow Q \vee R, \neg Q \rightarrow P, \neg Q \vee S \models S$
2. $P \rightarrow Q \vee R, \neg Q \rightarrow P \models S$
3. $P \rightarrow Q \vee R, \neg Q \rightarrow P, \neg Q \vee S, \neg R \models S$
4. $P \rightarrow Q \vee R, \neg Q \rightarrow P, \neg Q \vee S, \neg R, A \vee B \models S$
5. $P \rightarrow Q \vee R, \neg Q \rightarrow P \models S \vee \neg S$
6. $P \rightarrow Q \vee R, \neg Q \rightarrow P, \neg Q \vee (A \rightarrow B), \neg R \models (A \rightarrow B)$

Exercise 3 (5 points + 2 points)

Translate the following statements into propositional language:

Three students, Ali, Brahim, and Cylia, are trying to figure out how their module was validated. Here are the clues they have :

1. If Ali validated the module, then he did so through continuous assessment.
2. If Brahim validated the module, then he did so through a final exam.
3. If Cylia validated the module, then she did so through a project.
4. No one validated the module through a final exam.
5. Ali did not validate the module through continuous assessment.

Who validated the module, knowing that only one of the three did?