Sample Exam

Philosophy 305

TBC

Instructions

- You have **3 hours** for the exam.
- Type up any answers you can.
- But for things you can't type - especially trees - write them out on paper, take a photo of them, and upload the photo.
- Note that there will be fewer questions than this on the final, but the structure will be similar. The point of this is to give you a sense of the kind of questions that there will be.

Truth Tables

For each of these sequents, do a truth table to test whether they are valid. In each case, say whether they are valid.

1. $A \vee B, B \rightarrow A \vDash A$
2. $\neg(A \wedge B), \neg(B \rightarrow A) \vDash A$
3. $A \rightarrow B \vDash B \rightarrow A$
4. $A \rightarrow (B \vee C), C \rightarrow (A \vee B) \vDash B$

Truth Trees

For each of these sequents, do a truth table to test whether they are valid. In each case, say whether they are valid.

5. $A \vee B, B \rightarrow A \vDash A$
6. $\neg(A \wedge B), \neg(B \rightarrow A) \vDash A$
7. $A \rightarrow B \vDash B \rightarrow A$
8. $A \rightarrow (B \vee C), C \rightarrow (A \vee B) \vDash B$

Proofs

Construct a proof for each of the following

9. $P \to (Q \land R), S \land P \vdash R \land (S \lor T)$
10. $(P \land Q) \to R \vdash P \to (Q \to R)$
11. $P \to R, Q \to R \vdash (P \lor Q) \to R$
12. $P \to (Q \land R), P \to (R \to \neg Q) \vdash \neg P$

Probability

13. A fair coin (with equal chance of landing heads and landing tails) is about to be flipped. Ankita is offered the following bet - if it lands heads she wins $200, and if it lands tails she loses $100. Do we know enough to advise Ankita whether or not she should take the bet? Why or why not?
14. Explain why the following decision rule is not generally reasonable: Identity the most likely state; then choose an act which maximizes utility in that state. (Hint: Describe a situation where this would lead to doing something unreasonable.)

Modal Logic

For each of the following sentences, do **three** truth trees: one to check whether it is a logical truth in K, one to check whether it is a logical truth in S4, and one to check whether it is a logical truth in KT4B (i.e., S5). You can use the simplified rules for S5.

15. $\Box(\Box A \to B) \lor \Box A$
16. $\Diamond(A \to \Diamond\Box A)$

Conditionals

17. Show that $\Box(A \to B) \to \Box((A \land C) \to B)$ is a theorem of S5.
18. Describe a sphere model (from the minimal change semantics chapter of Boxes And Diamonds) that shows $((A \boxdot\!\!\to B) \land (B \boxdot\!\!\to C)) \to (A \boxdot\!\!\to C)$ is not a logical truth in the minimal change semantics.