Week 10 Quiz

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Q1

10.0/10.0 points (graded)

$((p \rightarrow q) \wedge (q \rightarrow r)) \rightarrow (p \rightarrow r)$

Consider the above proposition in propositional logic. Is this proposition a:

- [x] tautology? ✔
- [ ] fallacy?
- [ ] contingency?

✔

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Answers are displayed within the problem

Q2

10.0/10.0 points (graded)

Among the following propositions, which ones are logically equivalent?

- [x] $p \leftrightarrow q$ ✔

- [ ] $(p \wedge \neg q) \wedge \neg(\neg p \rightarrow \neg q)$
- [x] $\neg(p \wedge \neg q) \wedge (\neg p \rightarrow \neg q)$ ✔
- [ ] $\neg(p \wedge \neg q) \vee (\neg p \rightarrow \neg q)$

✔

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Q3

10.0/10.0 points (graded)

Let p be a proposition in propositional logic. p : John is not tall and John is thin. What is the $\neg p$ (negation of p)?

- [ ] John is tall or John is thin
- [ ] John is tall and John is not thin
- [ ] John is not tall and John is not thin
- [x] John is tall or John is not thin ✔

✔

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Q4

10.0/10.0 points (graded)

The CNF of $(p \rightarrow q) \rightarrow r$ is:

- [ ] $(\neg p \vee r) \wedge (\neg q \vee \neg r)$
- [x] $(p \vee r) \wedge (\neg q \vee r)$ ✔
- [ ] $(p \wedge r) \vee (\neg q \wedge r)$

✔

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Q5

10.0/10.0 points (graded)

Given the following KB:

$$KB = \{P \vee Q \vee R, \neg P \vee R, \neg Q\}$$

using model checking, does $KB \models R$?

- (•) Yes ✔
- ( ) No

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Q6

10.0/10.0 points (graded)

Given the following KB:

$$KB = \{P \vee \neg Q, \neg Q \vee R, \neg P \vee \neg R\}$$

using model checking, does $KB \models Q$?

- Yes
- No ✔

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Q7

10.0/10.0 points (graded)

Which inference rule is used to make this inference?

$$\frac{\text{If it snows today, the university will close} \quad \text{The university is not closed today}}{\text{It did not snow today}}$$

- Modus Ponens
- Modus Tollens ✔

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Q8

10.0/10.0 points (graded)

Which inference rule is used to make this inference?

$$\frac{\text{If it is rainy, then the pool will be closed} \quad \text{It is rainy}}{\text{The pool is closed}}$$

- (•) Modus Ponens ✔
- ( ) Modus Tollens

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Q9

10.0/10.0 points (graded)
Check all that apply.

- [x] First order logic is more powerful than propositional logical because it can model objects and the relations between them ✔
- [ ] Inference in propositional logic with horn clauses is sound but not complete
- [x] Backward chaining works backwards from the query ✔
- [ ] Logical agents are black box models because the models they build about the world are not intelligible

✔

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Q10

10.0/10.0 points (graded)
Check all that apply.

- [x] Inference can be cast as a search problem ✔

- [ ] The resolution algorithm uses a proof by contradiction, that is it shows that $KB \wedge \neg \alpha$ is satisfiable
- [x] A horn clause is a logic proposition of the form: $p_1 \wedge \ldots \wedge p_n \rightarrow q$ ✔
- [x] Every sentence in propositional logic can be written in Conjunctive Normal Form (CNF) ✔

✔

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English