Quiz 10

Deadline	Monday, 28 October 2019 at 4:00PM
Latest Submission	Sunday, 27 October 2019 at 1:33PM
Raw Mark	4.00/5.00 (80.00%)
Late Penalty	N/A
Final Mark	4.00/5.00 (80.00%)

Question 1 (1 mark)

Assume {p,q} ⊆ Prop. Which of the following are well-formed formulas under the strictest definition (i.e. no conventional omissions)? Select all that apply.

(a) ☑	$\neg(p\wedge q)$
(b) ☐	$p\rightarrow\neg\top$
(c) ☑	$((p \wedge q) \vee (q \wedge \bot))$
(d) ☑	$\neg\neg\neg\bot$
(e) ☐	$(\bot \vee (\neg\top))$

✔ Your response was correct.
Mark: max(0.33 + 0.33 + 0.33, 0) = 1.00

Question 2 (1 mark)

The *dual* of a propositional formula is defined recursively as follows. If PF is the set of propositional formulas over Prop, we define dual:PF→PF as follows:

- $\mathrm{dual}(\top) = \bot$; $\mathrm{dual}(\bot)=\top$;
- dual(p) = p for all $p\in$Prop
- $\mathrm{dual}(\neg\varphi) = \neg\, \mathrm{dual}(\varphi)$;
- $\mathrm{dual}(\varphi\wedge\psi) = (\mathrm{dual}(\varphi) \vee \mathrm{dual}(\psi))$
- $\mathrm{dual}(\varphi\vee\psi) = (\mathrm{dual}(\varphi) \wedge \mathrm{dual}(\psi))$

Let $\varphi =((p\wedge\neg q)\vee\top)$

What is dual(φ)?

(a) ○	$((\neg p\vee q)\wedge\bot)$

(b) ◉	$((p \vee \neg q) \wedge \bot)$
(c) ○	$((\neg p \wedge q) \vee \top)$
(d) ○	$\bot$
(e) ○	None of the above

✔ Your response was correct.
Mark: 1.00

Question 3 (1 mark)

As before, let PF be the set of well-formed formulas over Prop. Define flip:PF→PF recursively as follows:

- flip($\top$) = $\top$; flip($\bot$)=$\bot$;
- flip(p) = $\neg$p for all p$\in$Prop
- flip($\neg\varphi$) = $\neg$flip(φ);
- flip($\varphi \wedge \psi$) = (flip(φ) $\wedge$ flip(ψ))
- flip($\varphi \vee \psi$) = (flip(φ) $\vee$ flip(ψ))

Let φ =$((p \wedge \neg q) \vee \top)$

What is flip(φ)?

(a) ○	$((\neg p \vee q) \wedge \bot)$
(b) ○	$((p \vee \neg q) \wedge \bot)$
(c) ◉	$((\neg p \wedge q) \vee \top)$
(d) ○	$\bot$
(e) ○	None of the above

✖ Your response was incorrect.
The correct response was: (e)
Mark: 0.00

flip(φ) = $((\neg p \wedge \neg\neg q) \vee \top)$

Question 4 (1 mark)

Which symbol appears at the top of the parse tree for the formula:

φ =$((p \wedge \neg q) \vee \top)$

(a) ◉	$\vee$
(b) ○	$\wedge$

(c) ○	¬
(d) ○	⊤
(e) ○	None of the above

✔ Your response was correct.
Mark: 1.00

Question 5 (1 mark)

Suppose v:Prop→𝔹 is defined as v(p) = true; v(q) = false.

Let φ =((p∧¬q)∨⊤)

If we extend v to all propositional formulas as described in lectures, what is v(φ)?

(a) ◉	True
(b) ○	False

✔ Your response was correct.
Mark: 1.00