Module1-quiz-Fall 23

Due Sep 3 at 11:59pm **Points** 10 **Questions** 10
Available Aug 20 at 12am - Sep 3 at 11:59pm **Time Limit** 300 Minutes

Submission Details:

Time:	87 minutes
Current Score:	9 out of 10
Kept Score:	9 out of 10

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	87 minutes	9 out of 10

Correct answers will be available on Sep 4 at 3:01am.

Score for this quiz: **9** out of 10
Submitted Aug 29 at 9:57pm
This attempt took 87 minutes.

Question 1 — 1 / 1 pts

Consider the following propositional formulas:

$P \rightarrow (Q \wedge R)$

$(P \wedge S) \rightarrow \neg Q$

$(R \vee \neg S) \leftrightarrow P$

Where P, Q, R and S are propositional variables. Which of the following combinations of the truth values satisfy all three formulas simultaneously?

- (●) P=True, Q=True, R=True, S=False
- ( ) P=True, Q=False, R=False, S=True
- ( ) P=False, Q=False, R=True, S=True
- ( ) P=False, Q=True, R=True, S=False

Question 2 — 1 / 1 pts

Consider the following propositional logic formula:

$(A \wedge B) \vee ((C \rightarrow D) \wedge (\neg E \leftrightarrow (A \wedge C)))$

Which of the following assignments of truth values to variables A,B, C, D, and E will make the formula **False**?

- ( ) A=True, B=True, C=True, D=True, E=True
- ( ) None of the above
- (●) A=True, B=False, C=True, D=True, E=True
- ( ) A=True, B=False, C=True, D=True, E=False

Question 3 — 1 / 1 pts

Apply unit propagation on the formula
$(\neg A \wedge B \wedge C) \vee (A \vee B) \wedge (C \vee \neg D) \wedge (D \vee \neg A) \wedge (\neg C \vee \neg D)$,
starting with an empty set of U literals. What is/are the resulting set of U literals after the first three iterations?

- [ ] $U-1=\{\neg A\}, U-2=\{\neg A, \neg B\}, U-3=\{\neg A, \neg B, \neg C\}$
- [x] $U-1=\{\neg A\}, U-2=\{\neg A, B\}, U-3=\{\neg A, B, \neg C\}$
- [x] $U-1=\{\neg A\}, U-2=\{\neg A, B\}, U-3=\{\neg A, B, C\}$
- [ ] $U-1=\{\neg A\}, U-2=\{B\}, U-3=\{C\}$

Question 4

1 / 1 pts

What is the concept that involves starting with a theory, a collection of hypotheses, and an empirical observation, and aims to determine the most probable explanation for that event?

- ( ) Epistemic reasoning
- ( ) Default reasoning
- (•) Abductive reasoning
- ( ) Deductive reasoning

Incorrect

Question 5

0 / 1 pts

Which of the following logic formulas is/are entailed by $(p \wedge q) \rightarrow q$?

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

All interpretations of p and q that satisfy $(p \wedge q) \rightarrow q$ also satisfies the given correct options.

These interpretations are:
I(p)=f, I(q)=f

I(p)=f, I(q)=t

I(p)=t, I(q)=f

I(p)=t, I(q)=t.

For all the other answer choices, there is at least one interpretation of p and q for which $(p \wedge q) \rightarrow q$ is satisfied but the formula on the right side is not.

Question 6

1 / 1 pts

F: $(p_1 \wedge q_1) \vee (p_2 \wedge q_2) \vee (p_3 \wedge q_3)$

For the above Formula F how may clauses will be generated by Clausify* (F, Γ) ?

- 8
- 10
- 9
- 12

For clausify we will have 2^3 = 8 clauses and for clausify* we will have (1 + 9) = 10 clauses that can be generated.

Question 7

1 / 1 pts

P and Q are two propositions. which of the following are equivalent?

I: $P \longrightarrow Q$

II: $P \vee \neg Q$

III: $\neg P \vee Q$

IV: $\neg Q \longrightarrow \neg P$

- I, III, IV
- I, II
- I, III
- I, II, IV

I, III are equivalent. IV can be simplified to III

$\neg Q \longrightarrow \neg P = \neg(\neg Q) \vee \neg P = Q \vee \neg P$

Question 8

1 / 1 pts

What is the final model obtained after applying DPLL to the below formula when there is no unit clause?

$(\neg p \vee q) \wedge (\neg p \vee r) \wedge (q \vee r) \wedge (\neg q \vee \neg r)$

- {p, q, ¬r }
- {¬p, ¬q, ¬r }
- {¬p, q, ¬r }
- {p, q, r}

After applying DPLL iteration for three times {¬p, q, ¬r } model comes out to be true

Question 9

1 / 1 pts

A propositional formula F is a tautology if every interpretation satisfies F.

- (●) True
- ( ) False

If every interpretation satisfies F it is a tautology.

Question 10

1 / 1 pts

What are the total number of sub formulas that can be formed for below propositional formula

$((\neg p \wedge q) \longrightarrow (p \wedge (q \vee \neg r)))$

- (●) 9
- ( ) 10
- ( ) 7
- ( ) 8

subformals 1.p 2.q 3.r

4.$\neg$p 5.$\neg$r 6.($\neg$p $\wedge$ q)

7.(q $\vee$ $\neg$r) 8.(p $\wedge$ (q $\vee$ $\neg$r))

9. (($\neg$p $\wedge$ q) $\longrightarrow$ (p $\wedge$ (q $\vee$ $\neg$r)))

Quiz Score: **9** out of 10

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