

DPP 01

Data Science & Artificial Intelligence

Artificial Intelligence

Adversarial

Q1 What is the truth table for the propositional connective " \rightarrow "?

(A) $P \mid Q \mid P \rightarrow Q$ ----- $T \mid T \mid T \mid F \mid F \mid F \mid T \mid T \mid F \mid F \mid T$

(B) $P \mid Q \mid P \rightarrow Q$ ----- $T \mid T \mid F \mid T \mid F \mid T \mid F \mid T \mid F \mid F \mid T$

(C) $P \mid Q \mid P \rightarrow Q$ ----- $T \mid T \mid T \mid T \mid F \mid F \mid F \mid T \mid T \mid F \mid T$

(D) $P \mid Q \mid P \rightarrow Q$ ----- $T \mid T \mid F \mid T \mid F \mid F \mid F \mid T \mid T \mid F \mid T$

Q2 What is the negation of the proposition " $P \wedge Q$ "?

- (A) $\neg P \vee \neg Q$
- (B) $\neg(P \wedge Q)$
- (C) $\neg P \wedge \neg Q$
- (D) $(\neg P) \wedge (\neg Q)$

Q3 What is the disjunction of the propositions " P " and " $\neg Q$ "?

- (A) $P \vee \neg Q$
- (B) $P \wedge \neg Q$
- (C) $\neg P \vee \neg Q$
- (D) $\neg P \wedge \neg Q$

Q4 What is the conditional of the propositions " $\neg P$ " and " Q "?

- (A) $\neg P \rightarrow Q$

(B) $\neg P \wedge Q$

(C) $Q \rightarrow \neg P$

(D) $\neg Q \rightarrow P$

Q5 What is the biconditional of the propositions " P " and " Q "?

- (A) $P \leftrightarrow Q$
- (B) $P \wedge Q$
- (C) $\neg P \vee \neg Q$
- (D) $\neg P \wedge \neg Q$

Q6 What is a tautology?

- (A) A proposition that is always true
- (B) A proposition that is always false
- (C) A proposition that is sometimes true and sometimes false
- (D) A proposition that is neither true nor false

Q7 What is a contradiction?

- (A) A proposition that is always true
- (B) A proposition that is always false
- (C) A proposition that is sometimes true and sometimes false
- (D) A proposition that is neither true nor false

Q8 Which of the following propositional formulas is a tautology?

- (A) $(P \rightarrow Q) \wedge \neg Q$
- (B) $(P \vee Q) \rightarrow (\neg P \rightarrow Q)$
- (C) $(\neg P \wedge \neg Q) \rightarrow \neg(P \vee Q)$
- (D) $\neg(P \rightarrow Q) \rightarrow Q$



Answer Key

Q1 (A)

Q2 (B)

Q3 (A)

Q4 (A)

Q5 (A)

Q6 (A)

Q7 (B)

Q8 (B)



Hints & Solutions

Q1 Text Solution:

The propositional connective " \rightarrow " is called implication. It is true if and only if the antecedent (P) is false or the consequent (Q) is true.

Q2 Text Solution:

The negation of a proposition is the opposite of the proposition. The negation of " $P \wedge Q$ " is " $\neg(P \wedge Q)$ ".

Q3 Text Solution:

The disjunction of two propositions is true if at least one of the propositions is true. The disjunction of "P" and " $\neg Q$ " is " $P \vee \neg Q$ ".

Q4 Text Solution:

The conditional of two propositions is true if the antecedent ($\neg P$) is false or the consequent (Q) is true. The conditional of " $\neg P$ " and "Q" is " $\neg P \rightarrow Q$ ".

Q5 Text Solution:

The biconditional of two propositions is true if and only if both propositions have the same truth value (i.e., both are true or both are false). The biconditional of "P" and "Q" is " $P \leftrightarrow Q$ ".

Q6 Text Solution:

A tautology is a compound proposition that is always true, regardless of the truth values of its components.

Q7 Text Solution:

A contradiction is a compound proposition that is always false, regardless of the truth values of its components.

Q8 Text Solution:

Propositional formulas are evaluated using truth tables. The only propositional formula in the choices that is always true is $(P \vee Q) \rightarrow (\neg P \rightarrow Q)$



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