



## Truth Tables and Logical Equivalence

### Practice Questions

**Direction:** Select the letter of the correct answer.

1) Suppose that the propositions  $p$  is true,  $q$  is false, and  $r$  is true. Identify the truth value of the statement  $\sim p \Rightarrow \sim (q \vee r)$ .

- (a) true
- (b) false

2) Which of the following statements is logically equivalent to “If Mina bought a new car, then she won the lottery”?

- (a) If Mina did not buy a new car, then she won the lottery.
- (b) If Mina did not win the lottery, then she bought a new car.
- (c) If Mina did not win the lottery, then she would not have bought a new car.
- (d) If Mina bought a new car, then she did not win the lottery.

3) Which of the following is a tautology?

- (a)  $(p \wedge q) \Rightarrow p$
- (b)  $p \Rightarrow p \wedge q$
- (c)  $p \wedge q \Rightarrow q$
- (d) Both A and C

4) If  $p$  and  $q$  are both false. Identify the truth value of  $\sim p \wedge q \Leftrightarrow p \vee \sim q$

- (a) True
- (b) False

5) Suppose that statements  $a$  and  $b$  are logically equivalent. Which of the following is true?

- (a)  $a$  and  $b$  always have a truth value of true regardless of the truth values of their underlying propositions.
- (b) The implication  $a \Rightarrow b$  is a tautology



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- (c) The biconditional  $a \Leftrightarrow b$  is a tautology
- (d) Both B and C



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