

Chapter 2: Logic

TRUE/FALSE

1. The sentence “Brass is an element in the periodic table” is a logical statement.

ANS: T PTS: 1 REF: Statements and Logical Connectives

2. The statement “Staples are made of metal” is a simple statement.

ANS: T PTS: 1 REF: Statements and Logical Connectives

3. The two statements “ $(p \wedge r) \vee (p \wedge q)$ ” and “ $p \wedge (r \vee q)$ ” have identical truth tables.

ANS: T PTS: 1
REF: Truth Tables for Negation, Conjunction, and Disjunction

4. According to the known argument forms, the following argument is valid:

I can either work on my project tonight or go dancing.
I didn’t work on my project tonight.
Therefore, I went dancing.

ANS: T PTS: 1 REF: Symbolic Arguments

5. The following argument is valid:

$A \rightarrow B$
 $\sim C$
 $B \rightarrow C$
 $\therefore A$

ANS: F PTS: 1 REF: Symbolic Arguments

MULTIPLE CHOICE

1. Let “A” represent the statement “You eat your vegetables” and “B” represent the statement “You can have dessert.” Choose the appropriate symbolization of the compound statement “If you don’t eat your vegetables, you can’t have dessert.”

a. $\sim A \rightarrow B$ c. $\sim A \rightarrow \sim B$
b. $B \rightarrow \sim A$ d. $A \rightarrow \sim B$

ANS: C PTS: 1 REF: Statements and Logical Connectives

2. Let “A” represent the statement “I know where my hat is” and “B” represent the statement “I know where my gloves are.” Choose the appropriate symbolization of the compound statement “I don’t know where my hat is, but I know where my gloves are.”

a. $A \wedge B$ c. $A \wedge \sim B$
b. $\sim A \wedge B$ d. $\sim A \vee B$

ANS: B PTS: 1 REF: Statements and Logical Connectives

3. What is the negation of the statement “I can play baseball very well”?
- a. I cannot play softball very well.
 - b. I cannot play baseball very well.
 - c. I play baseball poorly.
 - d. I cannot play baseball.

ANS: B

PTS: 1

REF: Statements and Logical Connectives

4. What is the negation of the statement “Life is fair”?
- a. Life is foul.
 - b. Life is fair.
 - c. It is not the case that life is fair.
 - d. Life is ugly.

ANS: C

PTS: 1

REF: Statements and Logical Connectives

5. What is the inverse of the statement “If I don’t exercise today, I will eat a small lunch”? Recall that the inverse of $p \rightarrow q$ is $\sim p \rightarrow \sim q$.
- a. If I exercise today, I won’t eat a small lunch.
 - b. If I exercise today, I will eat a small lunch.
 - c. If I don’t eat a small lunch, I didn’t exercise today.
 - d. If I eat a small lunch, I didn’t exercise today.

ANS: A

PTS: 1

REF: Truth Tables for the Conditional and the Biconditional

6. What is the converse of the statement “If I don’t exercise today, I will eat a small lunch”? Recall that the converse of $p \rightarrow q$ is $q \rightarrow p$.
- a. If I exercise today, I won’t eat a small lunch.
 - b. If I exercise today, I will eat a small lunch.
 - c. If I don’t eat a small lunch, I didn’t exercise today.
 - d. If I eat a small lunch, I didn’t exercise today.

ANS: D

PTS: 1

REF: Truth Tables for the Conditional and the Biconditional

7. How can the statement “If I try to cook, I will burn down my house” be rewritten in the alternate form “A is sufficient for B”?
- a. Burning down my house is sufficient for me not trying to cook.
 - b. Burning down my house is sufficient for me trying to cook.
 - c. Me trying to cook is sufficient for burning down my house.
 - d. Me trying to cook is sufficient for not burning down my house.

ANS: C

PTS: 1

REF: Truth Tables for the Conditional and the Biconditional

8. How can the statement “To keep your job, you must be at work by 9am” be rewritten using the word combination “if-then”?
- a. If I don’t keep my job, then I’m not at work by 9am.
 - b. If I keep my job, then I’m not at work by 9am.
 - c. If I’m at work by 9am, then I keep my job.
 - d. If I keep my job, then I’m at work by 9am.

ANS: D

PTS: 1

REF: Truth Tables for the Conditional and the Biconditional

9. Which of the following statements is equivalent to $(p \wedge r) \vee r$?
- a. p
 - b. r
 - c. $p \wedge r$
 - d. $p \vee r$

ANS: B

PTS: 1

REF: Equivalent Statements

10. Which of the following statements is equivalent to $(p \rightarrow q) \leftrightarrow p$?
- | | |
|-----------------|---------------|
| a. p | c. q |
| b. $p \wedge q$ | d. $p \vee q$ |

ANS: B

PTS: 1

REF: Equivalent Statements

11. According to DeMorgan's Laws, what is the negation of the statement "You eat dessert and feel full"?
- You do not eat dessert or you do not feel full.
 - You eat dessert or you feel full.
 - You do not eat dessert and you do not feel full.
 - You eat dessert and you feel full.

ANS: A

PTS: 1

REF: Equivalent Statements

12. Name the law or fallacy used in the following argument:

If the dog gets loose, you have to catch him.

You didn't have to catch the dog.

Therefore, the dog didn't get loose.

- Law of detachment
- Law of contraposition
- Fallacy of the inverse
- Fallacy of the converse

ANS: B

PTS: 1

REF: Symbolic Arguments

13. Name the law or fallacy used in the following argument:

You must be at least five feet tall or you cannot ride the roller coaster.

You rode the roller coaster.

Therefore, you are at least five feet tall.

- Law of detachment
- Law of contraposition
- Law of disjunctive syllogism
- Fallacy of the converse

ANS: C

PTS: 1

REF: Symbolic Arguments

14. The following syllogism lacks a conclusion. Assuming the syllogism must be valid, choose a possible conclusion that follows from the premises.

None of my pens are red.

Some fire engines are red.

Therefore, ...

- a. None of my pens are fire engines. c. No fire engine is one of my pens.
b. All fire engines are not my pens. d. Some fire engines are not my pens.

ANS: D

PTS: 1

REF: Euler Diagrams and Syllogistic Arguments

15. The following syllogism lacks a conclusion. Assuming the syllogism must be valid, supply a possible conclusion that follows from the premises.

No restaurant serves liverwurst.

The Carnegie Deli is a restaurant.

Therefore, ...

- Liverwurst is served by the Carnegie Deli.
- Liverwurst is not the Carnegie Deli.

- c. The Carnegie Deli does not serve liverwurst.
- d. The Carnegie Deli is not a restaurant.

ANS: C

PTS: 1

REF: Euler Diagrams and Syllogistic Arguments

SHORT ANSWER

1. What is the inverse of the statement “If your favorite color is blue, then the moon is made of green cheese”? Recall that the inverse of $p \rightarrow q$ is $\sim p \rightarrow \sim q$.

ANS:

If your favorite color is not blue, then the moon is not made of green cheese.

PTS: 1

REF: Truth Tables for the Conditional and the Biconditional

2. What is the converse of the statement “If your favorite color is blue, then the moon is made of green cheese”? Recall that the converse of $p \rightarrow q$ is $q \rightarrow p$.

ANS:

If the moon is made of green cheese, then your favorite color is blue.

PTS: 1

REF: Truth Tables for the Conditional and the Biconditional

3. How can the statement “If I work hard today, I can take Friday off” be written in the alternate form “A is sufficient for B”?

ANS:

Working hard today is sufficient for taking Friday off.

PTS: 1

REF: Truth Tables for the Conditional and the Biconditional

4. How can the statement “In order for you to graduate, it is necessary that you pass Latin” be written using the word combination “if-then?”

ANS:

If you graduated, you passed Latin.

PTS: 1

REF: Truth Tables for the Conditional and the Biconditional

5. Use DeMorgan’s Laws to write the negation of the statement “You send the letter today or it will arrive late” in English.

ANS:

You do not send the letter today and it will not arrive late.

PTS: 1

REF: Equivalent Statements