Week 7 Quiz

Q1.

Which of the following statements correctly describes the use of logical connectives in propositional logic?

A. A) Logical connectives are used to represent the truth values of propositions only.

B. B) Logical connectives cannot be used to combine more than two propositions.

C. C) Logical connectives such as AND, OR, and NOT are used to combine propositions and form compound propositions.

D. D) Logical connectives are exclusively used for negating propositions.

Q2.

Which of the following best explains the concept of entailment in propositional logic?

A. A) A knowledge base entails a query if the query contradicts the knowledge base.

B. B) Entailment occurs when a knowledge base and a query are unrelated.

C. C) A knowledge base entails a query if the query is true given the facts and rules in the knowledge base.

D. D) Entailment is determined solely by the logical connectives used in the knowledge base.

Q3.

In a smart home system, consider the following propositions for automating the living room environment:

DARK: The light sensor detects darkness.
MOTION: Motion is detected in the room.
T: The time is between 6 PM and 6 AM.
A: Activate the room lights.

Based on these propositions, which of the following logical expressions correctly represents the condition under which the smart home system should activate the room lights. Lights should be activated if either the light sensor detects darkness or motion is detected in the room, and this condition is true only during the time between 6 PM and 6 AM

A. A) DARK MOTION T→ A

B. B) DARK MOTION T→ A

C. C) (DARK MOTION) T→ A

D. (D) (DARK MOTION) T→ A

Q4.

Convert the sentence "There exists a product with a price higher than $100" into First-Order Logic.

A. a) x (Product(x) Price(x) > 100)

B. b) x (Product(x) Price(x) > 100)

C. c) x (Product(x) → Price(x) > 100)

D. d) x (Product(x) → Price(x) > 100)

Q5.

Which quantifier expresses "for all" or "for every" in First Order Logic?

A. a)

B. b)

C. c)

D. d)

Q6.

Translate the statement "For every product that has been ordered, there exists a customer who placed the order" into First-Order Logic.

A. a) x (Product(x) Ordered(x) → y (Customer(y) PlacedOrder(y, x)))

B. b) x (Product(x) Ordered(x) → y (Customer(y) PlacedOrder(y, x)))

C. c) x (Product(x) → Ordered(x) y (Customer(y) PlacedOrder(y, x)))

D. d) x (Product(x) → Ordered(x) y (Customer(y) PlacedOrder(y, x)))

Q7.

Which of the following statements is true about First-Order Logic?

A. a) It cannot express relations between different objects.

B. b) It can only represent simple propositions.

C. c) It is more expressive than Propositional Logic.

D. d) It is primarily used in robotics.

Q8.

Convert the sentence "There exists a book that is written by the author" into First-Order Logic.

A. a) x (Book(x) WrittenByAuthor(x))

B. b) x (Book(x) WrittenByAuthor(x))

C. c) x (Book(x) → WrittenByAuthor(x))

D. d) x (Book(x) → WrittenByAuthor(x))

Q9.

Express the statement "Every transaction must be authorized by an administrator" in First-Order Logic.

A. a) x (Transaction(x) AuthorizedBy(x, Administrator))

B. b) x (Transaction(x) AuthorizedBy(x, Administrator))

C. c) x (Transaction(x) → AuthorizedBy(x, Administrator))

D. d) x (Transaction(x) → AuthorizedBy(x, Administrator))