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State Finished

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Time taken 1 hour 8 mins

Marks 25.00/30.00

Grade 8.33 out of 10.00 (83%)

Question 1

Correct

Mark 1.00 out of 1.00

Find the truth value of this compound proposition: $(q \rightarrow \neg p) \leftrightarrow (p \leftrightarrow q)$, where $p=F$, $q=T$.

- ☒ a. F
- ☐ b. T



The correct answer is: F

Question 2

Correct

Mark 1.00 out of 1.00

Which is the false value in these statements.

- ☐ a. $A \cup (B - A) = A \cup B$
- ☐ b. $A \subseteq (A \cup B)$
- ☒ c. $A \cap (B - A) = B$
- ☐ d. $A - B \subseteq A$



The correct answer is: $A \cap (B - A) = B$

Question 3

Correct

Mark 1.00 out of 1.00

Let p and q be the propositions. p : I bought a lottery ticket this week. q : I won the million dollar jackpot on Thursday. Express the English sentence "Either I did not buy a lottery ticket this week, or else I did buy one and win the million dollar jackpot" as a proposition.

- ☐ a. $p \rightarrow (p \vee q)$
- ☐ b. $\neg p \wedge (p \vee q)$
- ☒ c. $\neg p \vee (p \wedge q)$
- ☐ d. $p \wedge (p \wedge q)$



The correct answer is: $\neg p \vee (p \wedge q)$

Question 4

Correct

Mark 1.00 out of 1.00

Let p and q be the propositions. p : I bought a lottery ticket this week. q : I won the million dollar jackpot on Thursday. Express the English sentence "If I did not buy a lottery ticket this week, then I did not win the million dollar jackpot" as a proposition.

- ☐ a. $p \wedge q$
- ☐ b. $\neg p \vee q$
- ☐ c. $p \rightarrow \neg q$
- ☒ d. $\neg p \rightarrow \neg q$



The correct answer is: $\neg p \rightarrow \neg q$

Question 5

Correct

Mark 1.00 out of 1.00

Let p , q , and r be the propositions. p : You get an A on the final exam. q : You do every exercise in this book. r : You get an A in this class. Write a proposition to express this sentence "Getting an A on the final and doing every exercise in this book is sufficient for getting an A in this class."

- ☐ a. $(p \wedge q) \vee r$
- ☐ b. $p \wedge q \vee r$
- ☒ c. $(p \wedge q) \rightarrow r$
- ☐ d. $p \wedge q \wedge r$



The correct answer is: $(p \wedge q) \rightarrow r$

Question 6

Correct

Mark 1.00 out of 1.00

Find the compound proposition that is not a tautology.

- ☐ a. $(p \wedge q) \rightarrow (p \rightarrow q)$
- ☒ b. $\neg(p \rightarrow q) \rightarrow q$
- ☐ c. $\neg p \rightarrow (p \rightarrow q)$
- ☐ d. $\neg(p \rightarrow q) \rightarrow p$



The correct answer is: $\neg(p \rightarrow q) \rightarrow q$

Question 7

Correct

Mark 1.00 out of 1.00

Find the truth value of this compound proposition: $(p \leftrightarrow q) \oplus (p \leftrightarrow \neg q)$, where $p=F$, $q=F$.

- ☐ a. F
- ☒ b. T



The correct answer is: T

Question 8

Correct

Mark 1.00 out of 1.00

What is the cardinality of this set: $\{\emptyset, \{\emptyset\}, \{\emptyset, \{\emptyset\}\}$

- ☒ a. 3
- ☐ b. 1
- ☐ c. 0
- ☐ d. 2



The correct answer is: 3

Question 9

Correct

Mark 1.00 out of 1.00

Let $C(x)$ be the statement "x has a cat," let $D(x)$ be the statement "x has a dog," and let $F(x)$ be the statement "x has a ferret." Express each of this statement "Some student in your class has a cat and a ferret, but not a dog." in terms of $C(x)$, $D(x)$, $F(x)$, quantifiers, and logical connectives. Let the domain consist of all students in your class.

- ☐ a. $\exists x(C(x) \vee D(x) \vee F(x))$
- ☐ b. $\exists x(C(x) \vee F(x) \vee \neg D(x))$
- ☐ c. $\exists x(C(x) \wedge D(x) \wedge F(x))$
- ☒ d. $\exists x(C(x) \wedge F(x) \wedge \neg D(x))$



The correct answer is: $\exists x(C(x) \wedge F(x) \wedge \neg D(x))$

Question 10

Correct

Mark 1.00 out of 1.00

Let p and q be the propositions. p : I bought a lottery ticket this week. q : I won the million dollar jackpot on Thursday. Express the English sentence "I bought a lottery ticket this week if and only if I won the million dollar jackpot" as a proposition.

- ☒ a. $p \leftrightarrow q$
- ☐ b. $\neg p \vee q$
- ☐ c. $p \rightarrow q$
- ☐ d. $p \rightarrow \neg q$



The correct answer is: $p \leftrightarrow q$

Question 11

Incorrect

Mark 0.00 out of 1.00

Find the equivalence proposition of this: $q \rightarrow (p \vee r)$

- ☐ a. $\neg p \rightarrow (q \rightarrow r)$
- ☐ b. $\neg p \wedge (q \rightarrow r)$
- ☐ c. $\neg p \rightarrow (q \vee r)$
- ☒ d. $\neg p \vee (q \rightarrow r)$



The correct answer is: $\neg p \rightarrow (q \rightarrow r)$

Question 12

Correct

Mark 1.00 out of 1.00

Find the truth value of this compound proposition: $(p \oplus q) \wedge (p \oplus \neg q)$, where $p=T$, $q=T$.

- ☒ a. F
- ☐ b. T



The correct answer is: F

Question 13

Correct

Mark 1.00 out of 1.00

Determine whether this biconditionals are true or false: " $0 > 1$ if and only if $2 > 1$."

- ☐ a. T
- ☒ b. F



The correct answer is: F

Question 14

Correct

Mark 1.00 out of 1.00

Let p , q , and r be the propositions. p : You get an A on the final exam. q : You do every exercise in this book. r : You get an A in this class. Write a proposition to express this sentence "You will get an A in this class if and only if you either do every exercise in this book or you get an A on the final."

- ☒ a. $r \leftrightarrow (q \vee p)$
- ☐ b. $r \leftrightarrow (q \wedge p)$
- ☐ c. $r \rightarrow (q \wedge p)$
- ☐ d. $r \rightarrow (q \vee p)$



The correct answer is: $r \leftrightarrow (q \vee p)$

Question 15

Correct

Mark 1.00 out of 1.00

Which is the false value in these statements.

- ☒ a. $\{\{\emptyset\}\} \subset \{\{\emptyset\}, \{\emptyset\}\}$
- ☐ b. $\emptyset \in \{\emptyset\}$
- ☐ c. $\{\emptyset\} \subset \{\emptyset, \{\emptyset\}\}$
- ☐ d. $\emptyset \in \{\emptyset, \{\emptyset\}\}$



The correct answer is: $\{\{\emptyset\}\} \subset \{\{\emptyset\}, \{\emptyset\}\}$

Question 16

Correct

Mark 1.00 out of 1.00

Let p , q , and r be the propositions. p : You get an A on the final exam. q : You do every exercise in this book. r : You get an A in this class. Write a proposition to express this sentence "You get an A on the final, but you don't do every exercise in this book; nevertheless, you get an A in this class."

- ☒ a. $p \wedge \neg q \wedge r$
- ☐ b. $p \wedge \neg q \vee r$
- ☐ c. $p \wedge \neg q \vee \neg r$
- ☐ d. $p \wedge \neg q \wedge \neg r$



The correct answer is: $p \wedge \neg q \wedge r$

Question 17

Correct

Mark 1.00 out of 1.00

Translate this English sentence to the quantification: There exists an animal such that if it is a rabbit, then it hops. Where $R(x)$ is "x is a rabbit" and $H(x)$ is "x hops" and the domain consists of all animals.

- ☐ a. $\forall x(R(x) \wedge H(x))$
- ☐ b. $\exists x(R(x) \wedge H(x))$
- ☐ c. $\forall x(R(x) \rightarrow H(x))$
- ☒ d. $\exists x(R(x) \rightarrow H(x))$



The correct answer is: $\exists x(R(x) \rightarrow H(x))$

Question 18

Correct

Mark 1.00 out of 1.00

Find the compound proposition that is a tautology.

- ☐ a. $[\neg p \vee (p \wedge q)] \rightarrow q$
- ☐ b. $[(p \wedge q) \vee (p \rightarrow r) \wedge (q \rightarrow r)] \rightarrow r$
- ☐ c. $[(p \rightarrow q) \rightarrow (q \rightarrow r)] \wedge (p \rightarrow r)$
- ☒ d. $[p \wedge (p \rightarrow q)] \rightarrow q$



The correct answer is: $[p \wedge (p \rightarrow q)] \rightarrow q$

Question 19

Incorrect

Mark 0.00 out of 1.00

Which is the false value in these statements.

- ☐ a. $(A - C) \cap (C - B) = \emptyset$
- ☐ b. $(B - A) \cup (C - A) = (B \cup C) - A$
- ☐ c. $(A \cup B \cup C) \subseteq (A \cup B)$
- ☒ d. $(A \cup B) \subseteq (A \cup B \cup C)$



The correct answer is: $(A \cup B \cup C) \subseteq (A \cup B)$

Question 20

Correct

Mark 1.00 out of 1.00

Let $N(x)$ be the statement "x has visited Hoi An," where the domain consists of the students in your school. Express this English sentence in the quantification: Some student in the school has not visited Hoi An.

- ☐ a. $\neg \exists x N(x)$
- ☒ b. $\exists x \neg N(x)$
- ☐ c. $\neg \forall x N(x)$
- ☐ d. $\exists x N(x)$



The correct answer is: $\exists x \neg N(x)$

Question **21**

Correct

Mark 1.00 out of 1.00

Find the truth value of this compound proposition: $(p \oplus q) \vee (p \oplus \neg q)$, where $p=F$, $q=F$.

- ☐ a. F
- ☒ b. T



The correct answer is: T

Question **22**

Correct

Mark 1.00 out of 1.00

What is the cardinality of this set: \emptyset

- ☒ a. 0
- ☐ b. 1
- ☐ c. 3
- ☐ d. 2



The correct answer is: 0

Question **23**

Incorrect

Mark 0.00 out of 1.00

Find the equivalence proposition of this: $p \rightarrow (q \wedge r)$

- ☐ a. $\neg(p \rightarrow q) \wedge (p \rightarrow r)$
- ☒ b. $(p \rightarrow q) \wedge (q \rightarrow r)$
- ☐ c. $(p \rightarrow r) \wedge (q \rightarrow r)$
- ☐ d. $(p \rightarrow q) \wedge (p \rightarrow r)$



The correct answer is: $(p \rightarrow q) \wedge (p \rightarrow r)$

Question **24**

Correct

Mark 1.00 out of 1.00

What is the cardinality of this set: $\{\emptyset\}$

- ☐ a. 2
- ☐ b. 0
- ☒ c. 1
- ☐ d. 3



The correct answer is: 1

Question **25**

Correct

Mark 1.00 out of 1.00

Let $Q(x)$ be the statement " $x + 1 > 2x$." If the domain consists of all integers, which is the false values?

- ☒ a. $\forall x Q(x)$
- ☐ b. $\exists x Q(x)$
- ☐ c. $\exists x \neg Q(x)$
- ☐ d. $Q(-1)$



The correct answer is: $\forall x Q(x)$

Question **26**

Correct

Mark 1.00 out of 1.00

Which is the false value in these statements.

- ☒ a. $(A \oplus B) \oplus B = B$
- ☐ b. $A \oplus B = B \oplus A$
- ☐ c. $A \oplus B = (A - B) \cup (B - A)$
- ☐ d. $A \oplus B = (A \cup B) - (A \cap B)$



The correct answer is: $(A \oplus B) \oplus B = B$

Question 27

Correct

Mark 1.00 out of 1.00

Which is the false value in these statements if the domain consists of all real numbers.

- ☐ a. $\exists x(x^3 = -1)$
- ☒ b. $\forall x(2^x = x)$
- ☐ c. $\exists x(x^4 = x^2)$
- ☐ d. $\forall x((-x)^2 = x^2)$



The correct answer is: $\forall x(2^x = x)$

Question 28

Correct

Mark 1.00 out of 1.00

If n is an integer, $\lfloor n/2 \rfloor + \lceil n/2 \rceil = ?$

- ☒ a. n
- ☐ b. $2n$
- ☐ c. $n/2$
- ☐ d. $n/4$



The correct answer is: n

Question 29

Incorrect

Mark 0.00 out of 1.00

Find the compound proposition that is a tautology.

- ☒ a. $[p \wedge (p \rightarrow \neg q)] \rightarrow q$
- ☐ b. $[\neg p \wedge (p \vee q)] \rightarrow \neg q$
- ☐ c. $[(p \vee q) \wedge (p \rightarrow r) \vee (q \rightarrow r)] \rightarrow r$
- ☐ d. $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$



The correct answer is: $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$

Question **30**

Incorrect

Mark 0.00 out of 1.00

Determine whether this biconditionals are true or false: " $1 + 1 = 3$ if and only if monkeys can fly."

- ☒ a. F
- ☐ b. T



The correct answer is: T

[◀ Exercises-02](#)[3. Algorithms and Number Theory ▶](#)