Question 1 of 10

Suppose **U = {b, {c, 3}, 3, 4, {4, 5}, 5}** is a universal set with the following subsets:

A = {{c, 3}, 3, {4, 5}}, B = {b, {c, 3}, 4, 5} and **C = {b, 3, 4, 5}.**

Which one of the following statements regarding $\mathcal{P}(A)$ is **false**?

a. The cardinality of $\mathcal{P}(A)$ is 8.

b. $\{\{\}\} \subset \mathcal{P}(A)$

c. $\{3\} \in \mathcal{P}(A)$

d. $\mathcal{P}(A) = \{\{\}, \{\{c, 3\}\}, \{3\}, \{\{4, 5\}\}, \{\{c, 3\}, 3\}, \{\{c, 3\}, \{4, 5\}\}, \{3, \{4, 5\}\}\}$

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Question 2 of 10

Suppose **U = {{a, b}, a, c, d, {a, d}, e}** is a universal set with the following subsets:

A = {{a, b}, a, {a, d}}, B = {a, d, e} and **C = {{a, b}, a, d, {a, d}, e}.**

Which one of the following sets is **not** a subset of $\mathcal{P}(B)$?

a. {{ }, {a, d, e}}

b. {a, d}

c. {{a, d}, {a, e}}

d. {{ }}

Question 3 of 10

Let S = {{a}, b, {a, {b}}, c}.

Which one of the following relations on S is a strict partial order?

a. {({a}, b), (b, {a, {b}}), (c, b)}

b. {({a}, b), (c, {a, {b}}), (b, c)}

c. {(c, {a}), (b, {a}), ({a, {b}}, {a})}

d. {({a}, {a}), (b, b), (c, c)}

Question 4 of 10

Suppose **U = {b, {c, 3}, 3, 4, {4, 5}, 5}** is a universal set with the following subsets:

A = {{c, 3}, 3, {4, 5}}, B = {b, {c, 3}, 4, 5} and **C = {b, 3, 4, 5}.**

Which one of the following sets represents U + B?
a. U
b. {3, {4, 5}}
c. {b, {c, 3}, 4, 5}
d. (U – A) – C

Question 5 of 10

Suppose **U = {b, {c, 3}, 3, 4, {4, 5}, 5}** is a universal set with the following subsets:

A = {{c, 3}, 3, {4, 5}}, B = {b, {c, 3}, 4, 5} and **C = {b, 3, 4, 5}.**

Which one of the following sets represents B ∩ C?
a. {b, 3, 4, 5}
b. {b, 4, 5}
c. {4, 5}
d.{3, {c, 3}}

Question 6 of 10

Let C = {a, b, 1, 2}.

Which one of the following alternatives contains a relation on C that satisfies trichotomy?

a. {(a, 2), (1, a), (b, b), (b, 1), (2, b), (2, 1)}
b. {(a, b), (a, 2), (2, b), (1, b), (a, 1), (b, a)}
c. {(a, a), (a, b), (a, 1), (a, 2), (2, 1), (2, b)}
d. {(2, 1), (1, b), (b, a), (b, 2), (a, 2), (1, a)}

Question 7 of 10

Let **A = {1, 2, c, d}.** Which one of the following relations is NOT a functional relation on A?

a. {(1, c), (d, d), (2, 1)}
b. {(1, 1), (2, 1), (c, 1), (d, 1)}
c. {(1, 2), (c, d), (d, c), (1, d)}
d. {(d, 1)}

Question 8 of 10

Which one of the statements in the following alternatives is equivalent to $(\neg p \rightarrow q) \vee q$? (***Hint***: simplify the given statement using logical equivalences.)

a. $\neg p \vee q$
b. $p \vee q$
c. $p \vee \neg q$
d. $\neg p \vee \neg q$

Question 9 of 10

Consider the two statements below:

Statement 1: $\forall x \in \mathbb{Z}, [(3 - 2x \leq 3) \vee (x^2 - 3 \geq 1)]$

Statement 2: $\exists x \in \mathbb{Z}^+, \quad [(4 - x^2 > 1) \wedge (1 - 3x \geq -2)]$

Which one of the following alternatives is true regarding statements 1 and 2?

a. Statement 1 is false and statement 2 is true.
b. Statement 1 is true and statement 2 is false.
c. Both statements 1 and 2 are false.
d. Both statements 1 and 2 are true.

Question 10 of 10

Consider the statement

If n is even, then $4n^2 + 7n - 1$ is odd.

Which one of the followir g statements provides the **converse** of the given statement?

a. If n is odd, then $4n^2 + 7n - 1$ is even.
b. If $4n^2 + 7n - 1$ is even. then n is odd.
c. If $4n^2 + 7n - 1$ is odd, then n is even.
d. If n is even, then $4n^2 + 7n - 1$ is even.