

Unit 2

Set theory

Choose the Correct Answer

1. Which of the following represents an empty set?

A) $\{0\}$
B) $\{\emptyset\}$
C) $\emptyset$
D) $\{1, 2\}$

Answer: C) $\emptyset$

2. If $A = \{1, 2, 3\}$, how many elements does A contain?

A) 2
B) 3
C) 4
D) 0

Answer: B) 3

3. Which symbol represents “is an element of”?

A) $\subset$
B) $\in$
C) $\cup$
D) $\cap$

Answer: B) $\in$

4. If $A = \{1, 2\}$ and $B = \{2, 3\}$, then $A \cup B$ is:

A) $\{1\}$
B) $\{2\}$
C) $\{1, 2, 3\}$
D) $\{1, 3\}$

Answer: C) $\{1, 2, 3\}$

5. If $A = \{1, 2\}$ and $B = \{2, 3\}$, then $A \cap B$ is:

A) $\{1, 2, 3\}$
B) $\{1\}$
C) $\{2\}$
D) $\{3\}$

Answer: C) $\{2\}$

6. Which of the following is a subset of $\{1, 2, 3\}$?

A) $\{1, 4\}$
B) $\{2, 3\}$
C) $\{4, 5\}$

D) $\{0, 1\}$

Answer: B) $\{2, 3\}$

7. **A relation R on a set A is reflexive if:**

A) aRb implies bRa

B) aRb and bRc imply aRc

C) aRa for every $a \in A$

D) aRb implies $a = b$

Answer: C) aRa for every $a \in A$

8. **A relation is symmetric if:**

A) $aRb \Rightarrow bRa$

B) $aRb \Rightarrow aRa$

C) aRb and $bRc \Rightarrow aRc$

D) $aRb \Rightarrow a = b$

Answer: A) $aRb \Rightarrow bRa$

9. **Which relation is reflexive, antisymmetric, and transitive?**

A) Equivalence relation

B) Partial-order relation

C) Symmetric relation

D) Universal relation

Answer: B) Partial-order relation

10. **A function is a mapping from:**

A) Range to domain

B) Domain to codomain

C) Codomain to domain only

D) Set to element only

Answer: B) Domain to codomain

11. **In a function, each element of the domain has:**

A) No image

B) Exactly one image

C) Two images

D) At least two images

Answer: B) Exactly one image

12. **A function in which every element of the codomain has a preimage is called:**

A) Injective

B) Surjective

C) Constant

D) Identity

Answer: B) Surjective

13. A function that is both injective and surjective is called:

- A) Constant function
- B) Identity function
- C) Bijective function
- D) Partial function

Answer: C) Bijective function

14. The Cartesian product $A \times B$ consists of:

- A) Elements common to A and B
- B) Ordered pairs (a, b) , where $a \in A$ and $b \in B$
- C) Only elements of A
- D) Only elements of B

Answer: B) Ordered pairs (a, b) , where $a \in A$ and $b \in B$

15. Which of the following is used to represent relationships between elements of sets?

- A) Relation
- B) Constant
- C) Variable
- D) Algorithm

Answer: A) Relation

Fill in the Blanks

1. A collection of well-defined objects is called a _____.
2. The objects belonging to a set are called _____.
3. The symbol used to denote the empty set is _____.
4. If every element of set A is also an element of set B, then A is called a _____ of B.
5. The number of elements in a finite set is called its _____.
6. The union of sets A and B is denoted by _____.
7. The intersection of sets A and B is denoted by _____.
8. A set containing all elements under consideration is called the _____ set.
9. A relation from set A to set B is a subset of _____.
10. A relation that is reflexive, symmetric, and transitive is called an _____ relation.
11. A relation that is reflexive, antisymmetric, and transitive is called a _____ relation.

12. A function maps each element of the domain to exactly one element of the _____.
13. The set of all possible input values of a function is called its _____.
14. The set of all output values of a function is called its _____.
15. A function in which different elements of the domain have different images is called an _____ function.

Answers

1. Set
2. Elements
3. $\emptyset$
4. Subset
5. Cardinality
6. $A \cup B$
7. $A \cap B$
8. Universal
9. $A \times B$
10. Equivalence
11. Partial-order
12. Codomain
13. Domain
14. Range
15. Injective