Unit 1: Set Theory

1. If A={x, y, z}, then the number of subsets in powerset of A is
   a) 6
   b) 8
   c) 7
   d) 9
2. In class of 105 students out of three subjects Maths, Physics, Chemistry each student studies at least one subject. In maths 47, in physics 50, and in chemistry 52 students study, 16 in maths and physics, 17 in maths and chemistry and 16 in physics and chemistry students both subjects.
   What will be the number of students who study only two subjects?
   a) 31
   b) 32
   c) 33
   d) 34
3. Consider the following statements:
   1. The null set is a subset of every set.
   2. Every set is a subset of itself.
   3. If a set has 10 elements. Then its power set will have 1024 elements.
   a) 1 and 2 only
   b) 2 and 3 only
   c) 1 and 3 only
   d) 1, 2 and 3
4. The number of element in the power set P(S) of set S= {2, {1, 4}} is?
   a) 2
   b) 4
   c) 8
   d) 10
5. If A and B are non-empty subsets of a set C, then $\boldsymbol{A} \cup (\boldsymbol{A} \cap \boldsymbol{B})$ is equal to
   a) A ∩B
   b) A∪B
   c) A
   d) B
6. For any set A, (A')' is equal to ------- .
   a) AA'
   b) A'
   c) A
   d) Ø
7. If A={x: x is a letter in word BELOW}, B={x: x is a letter in word WOOL} and C=A-B, then the number of subsets of C is
   a) 1
   b) 2

c) 3
d) 4

8. The subsets of the set {0} will be
   a) Ø
   b) Ø, {0}
   c) {0}
   d) Ø, {0}, {0, Ø }
9. If A and B be any two sets such that A Δ B = A, then A ∩B is
   a) Ø
   b) A
   c) B
   d) A∪B
10. A = {1, 3, 5}, B={2, 4, 6} and C={0,2,4,6,8}. Which of the following may be considered as universal set for all the three sets A, B, C?
   a) {0,1,2,3,4,5,6}
   b) {0,1,5,6}
   c) {0,1,2,3,4,5,6,7,8,9,10}
   d) {1,2,3,4,5,6,7,8}
11. The set of intelligent students in a class is:
   a) a null set
   b) a singleton set
   c) a finite set
   d) not a well-defined collection
12. Which of the following is correct for A-B
   a) A ∩ B
   b) A' ∩ B
   c) A ∩ B'
   d) A' ∩ B'
13. Which of the following properties are associative law?
   a) A ∪ B = B ∪ A
   b) A ∪ C = C ∪ A
   c) A ∪ D= D ∪ A
   d) (A ∪ B) ∪ C=A ∪ (B ∪ C)
14. If A={x,y}, then the power set of A is:
   a) {xx, yy}
   b) {f,x,y}
   c) {{ }, {x}, {2y}}
   d) {{ },{x},{y},{x,y}}
15. If x is a set and the set contains an integer which is neither positive nor negative then the set x is _____.
   a) set is empty
   b) set is non-empty
   c) set is finite

d) set is finite

16. If x ∈ N and x is prime, then x is _____ set.
    a) infinite set
    b) finite set
    c) empty set
    d) not a set

17. If x is a set and the set contains the real number between 1 and 2, then the set is _____.
    a) empty set
    b) finite set
    c) infinite set
    d) none of the mentioned

18. Which of the following is a subset of set {1, 2, 3, 4}?
    a) {1,2}
    b) {1,2,3}
    c) {1}
    d) all of the mentioned

19. What is the Cartesian product of set A and set B, if the set A = {1, 2} and set B = {a, b}?
    a) {(1, a), (1, b), (2, a), (b, b)}
    b) {(1, 1), (2, 2), (a, a), (b, b)}
    c) {(1, a), (2, a), (1, b), (2, b)}
    d) {(1, 1), (a, a), (2, a), (1, b)}

20. The members of the set S = {x | x is the square of an integer and x < 100} is _____
    a) {0, 2, 4, 5, 9, 55, 46, 49, 99, 81}
    b) {1, 4, 9, 16}
    c) {0, 1, 4, 9, 16, 25, 36, 49, 64, 81}
    d) {0, 1, 4, 9, 25, 36, 49, 123}

21. The intersection of the sets {1, 2, 8, 9, 10, 5} and {1, 2, 6, 10, 12, 15} is the set _____
    a) {1,2,10}
    b) {5,6,12,15}
    c) {2,5,10,9}
    d) {1,6,12,9,8}

22. The difference of {1, 2, 3, 6, 8} and {1, 2, 5, 6} is the set _____
    a) {1, 3}
    b) {5, 6, 8}
    c) {3, 8}
    d) {2, 6, 5}

23. If n(A) = 20 and n(B) = 30 and n(A ∪ B) = 40 then n(A ∩ B) is?
    a) 20
    b) 30

c) 40
d) 10

24. Which option contains two equal sets?
a) X = {5, 6} and Y = {6}
b) X = {5, 6, 8, 9} and Y = {6, 8, 5, 9}
c) X = {5, 6, 9} and Y = {5, 6}
d) X = {5, 6} and Y = {5, 6, 3}

25. The Cartesian product of the (Set Y) x (Set X) is equal to the Cartesian product of (Set X) x (Set Y) or Not?
a) Yes
b) no
c) None of the above
d) I Don't know

26. How many elements in the Power set of set A= {{Φ}, {Φ, {Φ}}}?
a) 4
b) 2
c) 6
d) 5

27. If X = {2, 8, 12, 15, 16} and Y= {8, 16, 15, 18, 9} then union of X and Y is_____.
a) {2, 8, 12, 15, 16}
b) { 8, 16, 15}
c) {8, 16, 15, 18, 9}
d) {2, 8, 9, 12, 15, 16, 18}

28. A _____ is an ordered collection of objects.
a) Relation
b) Function
c) Set
d) Proposition

29. The number of elements in the Power set P(S) of the set S = [[Φ],1,[2, 3]] is
a) 4
b) 8
c) 1
d) 2

30. If A and B are sets and A∪ B= A ∩ B, then
a) A= Φ
b) B= Φ
c) A=B
d) None of these

31. Let S be an infinite set and S1, S2, S3, ..., Sn be sets such that S1 ∪S2 ∪ S3∪....Sn = S then
a) atleast one of the sets Si is a finite set

b) not more than one of the set Si can be infinite
c) atleast one of the sets Si is an infinite set
d) none of these

32. Which of the following sets are null sets?
a) {0}
b) Ø
c) { }
d) Both (b) & (c)

33. In a survey of 1,000 consumers it is found that 720 consumers liked product A and 450 liked product B. What is the least number that must have liked both the products?
a) 70
b) 170
c) 270
d) None of these

34. If A = {1, 2, 3, 4} and B = {x ∈ N : x ≤ 5} then which of the following is true?
a) A ⊂ B
b) A = B
c) B ⊂ A
d) None of these

35. If A = {1, 3, 5} then find the cardinality of the power set of A ?
a) 4
b) 6
c) 9
d) 8

36. If A = {1, 2, 3, 4, 5, 7, 8, 9} and B = {2, 4, 6, 7, 9} then find the number of proper subsets of A ∩ B?
a) 16
b) 15
c) 32
d) 31

37. If A is a collection of intelligent students in a class and B is a collection of integers which are less than 5 then which of the following is true?
a) A is a set
b) B is a set
c) Neither A nor B is a set
d) Both A and B are sets

38. If A = {1, 3, 4} and B = {x: x ∈ R and x2 - 7x + 12 = 0} then which of the following is true?
a) A = B
b) A ⊂ B
c) B ⊂ A

d) A is equivalent to B

39. Consider the following statements: 1. The null set is a subset of every set. 2. Every set is a subset of itself. 3. If a set has 10 elements, then its power set will have 1024 elements. Which of the above statements are correct?
    a) 1 and 2 only
    b) 2 and 3 only
    c) 1 and 3 only
    d) 1, 2 and 3

40. If A = {x : x ∈ N and x ≤ 5} and B = {y : y ∈ R and y2 + y - 2 = 0 } then which of the following is true ?
    a) n(A) = n(B)
    b) n(A) < n(B)
    c) n(A) ≤ n(B)
    d) n(A) > n(B)

41. If A = {1, 2, 5, 7} and B = {2, 4, 6} then find the number of proper subsets of A U B?
    a) 127
    b) 64
    c) 63
    d) 31

42. If A is a non-empty set such that the power set of A is P(A) = {ϕ, {1}, {2}, {3}, {1, 2}, {2, 3}, {1, 3}, {1, 2, 3}} then find the set A?
    a) {1}
    b) {1, 2}
    c) {1, 2, 3}
    d) None of these

43. If B = {x : x ∈ N such that x2 + 11x + 30 = 0} then B is a/an ?
    a) Empty set
    b) Finite set
    c) Infinite set
    d) None of these

44. The set {x: x is an even prime number} can be written as
    a) {2}
    b) {2,4}
    c) {2,14}
    d) {2,4,14}

45. Let A and B be two non-empty subsets of a set X such that A is not a subset of B, then:
    a) A is a subset of complement of B
    b) B is a subset of A
    c) A and B are disjoint
    d) A and the complement of B are nondisjoint

46. Which of the following collections are sets?

a) The collection of all the days of a week
b) A collection of 11 best hockey player of india
c) The collection of all rich person in delhi
d) A collection of most dangerous animals of india

47.A _____ is an ordered collection of objects.
a) Relation
b) Function
c) Set
d) Proposition

48.Power set of empty set has exactly ------ subset.
a) One
b) Two
c) Zero
d) Three

49.The set O of odd positive integers less than 10 can be expressed by _____
a) {1, 2, 3}
b) {1, 3, 5, 7, 9}
c) {1, 2, 5, 9}
d) {1, 5, 7, 9, 11}

50.What is the cardinality of the set of odd positive integers less than 10?
a) 10
b) 5
c) 3
d) 20

51.Which of the following two sets are equal?
a) A = {1, 2} and B = {1}
b) A = {1, 2} and B = {1, 2, 3}
c) A = {1, 2, 3} and B = {2, 1, 3}
d) A = {1, 2, 4} and B = {1, 2, 3}

52.The set of positive integers is _____
a) Infinite
b) Finite
c) Subset
d) Empty

53.The members of the set S = {x | x is the square of an integer and x < 100} is _____
a) {0, 2, 4, 5, 9, 58, 49, 56, 99, 12}
b) {0, 1, 4, 9, 16, 25, 36, 49, 64, 81}
c) {1, 4, 9, 16, 25, 36, 64, 81, 85, 99}
d) {0, 1, 4, 9, 16, 25, 36, 49, 64, 121}