Assignment

Definitions, Types of Sets and Subset

Basic Level

1. In rule method the null set is represented by **[Karnataka CET 1998]**

(a) {} (b) ϕ (c) $\{x : x = x\}$ (d) $\{x : x \neq x\}$

2. $A = \{x : x \neq x\}$ represents **[Kurukshetra CEE 1998]**

(a) {0} (b) {} (c) {1} (d) {x}

3. If $A = \{\phi, \{\phi\}\}$, then the power set of A is

(a) A (b) $\{\phi, \{\phi\}, A\}$ (c) $\{\phi, \{\phi\}, (\{\phi\}\}, A\}$ (d) None of these

4. If $Q = \left\{x : x = \frac{1}{y}, \text{where } y \in N\right\}$, then

(a) $0 \in Q$ (b) $1 \in Q$ (c) $2 \in Q$ (d) $\frac{2}{3} \in Q$

5. Which set is the subset of all given sets

(a) {1, 2, 3, 4,.....} (b) {1} (c) {0} (d) {}

6. Let $S = \{0,1,5,4,7\}$. Then the total number of subsets of S is

(a) 64 (b) 32 (c) 40 (d) 20

7. The number of non-empty subsets of the set {1, 2, 3, 4} is **[Karnataka CET 1997; AMU 1998]**

(a) 15 (b) 14 (c) 16 (d) 17

8. If $A = \{1,2,3,4,5\}$, then the number of proper subsets of A is

(a) 120 (b) 30 (c) 31 (d) 32

Operations on Sets

Basic Level

9. Let $A = \{1,2,3,4\}, B = \{2,3,4,5,6\}$, then $A \cap B$ is equal to

(a) {2, 3, 4} (b) {1, 2, 3} (c) {5, 6} (d) {1}

10. The smallest set A such that $A \cup \{1, 2\} = \{1, 2, 3, 5, 9\}$ is

(a) {2, 3, 5} (b) {3, 5, 9} (c) {1, 2, 5, 9} (d) None of these

11. If $A \cap B = B$, then **[JMIEE 2000]**

(a) $A \subset B$ (b) $B \subset A$ (c) $A = \phi$ (d) $B = \phi$

12. For two sets $A \cup B = A$ iff

(a) $B \subseteq A$ (b) $A \subseteq B$ (c) $A \neq B$ (d) $A = B$

13. If A and B are two sets, then $A \cup B = A \cap B$ iff

(a) $A \subseteq B$ (b) $B \subseteq A$ (c) $A = B$ (d) None of these

14. Let A and B be two sets. Then

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(a) $A \cup B \subseteq A \cap B$ (b) $A \cap B \subset A \cup B$ (c) $A \cap B = A \cup B$ (d) None of these

15. Let $A = \{(x,y) : y = e^x, x \in R\}$, $B = \{(x,y) : y = e^{-x}, x \in R\}$. Then

(a) $A \cap B = \phi$ (b) $A \cap B \neq \phi$ (c) $A \cup B = R^2$ (d) None of these

16. If A = {2, 3, 4, 8, 10}, B = {3, 4, 5, 10, 12}, C = {4, 5, 6, 12, 14} then $(A \cap B) \cup (A \cap C)$ is equal to

(a) {3, 4, 10} (b) {2, 8, 10} (c) {4, 5, 6} (d) {3, 5, 14}

17. If A and B are any two sets, then $A \cap (A \cup B)$ is equal to

(a) A (b) B (c) A^c (d) B^c

18. If A, B, C be three sets such that $A \cup B = A \cup C$ and $A \cap B = A \cap C$, then **[Roorkee 1991]**

(a) $A = B$ (b) $B = C$ (c) $A = C$ (d) $A = B = C$

19. Let A = {a, b, c}, B = {b, c, d}, C = {a, b, d, e}, then $A \cap (B \cup C)$ is

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

20. If A = {2, 3, 4, 8, 10}, B = {3, 4, 5, 10, 12}, C = {4, 5, 6, 12, 14} then $(A \cup B) \cap (A \cup C)$ is equal to

(a) {2, 3, 4, 5, 8, 10, 12} (b) {2, 4, 8, 10, 12} (c) {3, 8, 10, 12} (d) {2, 8, 10}

21. If A and B are sets, then $A \cap (B - A)$ is

(a) ϕ (b) A (c) B (d) None of these

22. Two sets A, B are disjoint iff

(a) $A \cup B = \phi$ (b) $A \cap B \neq \phi$ (c) $A \cap B = \phi$ (d) $A - B = A$

23. 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 always a subset of the complement of B (b) B is always a subset of A

(c) A and B are always disjoint (d) A and the complement of B are always non-disjoint

24. If $A \subseteq B$, then $A \cap B$ is equal to

(a) A (b) B (c) A^c (d) B^c

25. If A and B are two sets, then $A \cap (A \cup B)'$ is equal to

(a) A (b) B (c) ϕ (d) None of these

26. Let $\cup = \{1,2,3,4,5,6,7,8,9,10\}$, $A = \{1,2,5\}, B = \{6,7\}$, then $A \cap B'$ is

(a) B' (b) A (c) A' (d) B

27. If A is any set, then

(a) $A \cup A' = \phi$ (b) $A \cup A' = \cup$ (c) $A \cap A' = \cup$ (d) None of these

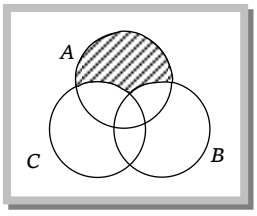
28. If $N_a = [an : n \in N\}$, then $N_6 \cap N_8 =$

(a) N_6 (b) N_8 (c) N_{24} (d) N_{44}

29. If $aN = \{ax : x \in N\}$, then the set $3N \cap 7N$ is

(a) 21 N (b) 10 N (c) 4 N (d) None of these

30. The shaded region in the given figure is



(a) $A \cap (B \cup C)$ (b) $A \cup (B \cap C)$ (c) $A \cap (B - C)$ (d) $A - (B \cup C)$

31. If $A = [x : f(x) = 0]$ and $B = [x : g(x) = 0]$, then $A \cap B$ will be

(a) $[f(x)]^2 + [g(x)]^2 = 0$ (b) $\frac{f(x)}{g(x)}$ (c) $\frac{g(x)}{f(x)}$ (d) None of these

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32. If A and B are two sets then $(A - B) \cup (B - A) \cup (A \cap B)$ is equal to

(a) $A \cup B$ (b) $A \cap B$ (c) A (d) B'

33. Let A and B be two sets then $(A \cup B)' \cup (A' \cap B)$ is equal to

(a) A' (b) A (c) B' (d) None of these

34. Let U be the universal set and $A \cup B \cup C = U$. Then $\{(A - B) \cup (B - C) \cup (C - A)\}'$ is equal to

(a) $A \cup B \cup C$ (b) $A \cup (B \cap C)$ (c) $A \cap B \cap C$ (d) $A \cap (B \cup C)$

Number of Elements in Sets

Basic Level

35. If $n(A) = 3$, $n(B) = 6$ and $A \subseteq B$. Then the number of elements in $A \cup B$ is equal to

(a) 3 (b) 9 (c) 6 (d) None of these

36. If $n(A) = 3$ and $n(B) = 6$ and $A \subseteq B$. Then the number of elements in $A \cap B$ is equal to

(a) 3 (b) 9 (c) 6 (d) None of these

37. Let A and B be two sets such that $n(A) = 0.16, n(B) = 0.14, n(A \cup B) = 0.25$. Then $n(A \cap B)$ is equal to

(a) 0.3 (b) 0.5 (c) 0.05 (d) None of these

38. If A and B are disjoint, then $n(A \cup B)$ is equal to

(a) $n(A)$ (b) $n(B)$ (c) $n(A) + n(B)$ (d) $n(A).n(B)$

39. If A and B are not disjoint sets, then $n(A \cup B)$ is equal to **[Kerala (Engg.) 2001]**

(a) $n(A) + n(B)$ (b) $n(A) + n(B) - n(A \cap B)$ (c) $n(A) + n(B) + n(A \cap B)$ (d) $n(A)n(B)$ (e) $n(A) - n(B)$

40. In a battle 70% of the combatants lost one eye, 80% an ear, 75% an arm, 85% a leg, x% lost all the four limbs. The minimum value of x is

(a) 10 (b) 12 (c) 15 (d) None of these

Advance Level

41. In a certain town 25% families own a phone and 15% own a car, 65% families own neither a phone nor a car. 2000 families own both a car and a phone. Consider the following statements in this regard:

1. 10% families own both a car and a phone
2. 35% families own either a car or a phone
3. 40,000 families live in the town

Which of the above statements are correct ?

(a) 1 and 2 (b) 1 and 3 (c) 2 and 3 (d) 1, 2 and 3

42. Out of 800 boys in a school, 224 played cricket, 240 played hockey and 336 played basketball. Of the total, 64 played both basketball and hockey; 80 played cricket and basketball and 40 played cricket and hockey; 24 played all the three games. The number of boys who did not play any game is

(a) 128 (b) 216 (c) 240 (d) 160

43. A survey shows that 63% of the Americans like cheese whereas 76% like apples. If x% of the Americans like both cheese and apples, then

(a) $x = 39$ (b) $x = 63$ (c) $39 \le x \le 63$ (d) None of these

44. 20 teachers of a school either teach mathematics or physics. 12 of them teach mathematics while 4 teach both the subjects. Then the number of teachers teaching physics only is

(a) 12 (b) 8 (c) 16 (d) None of these

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45. Of the members of three athletic teams in a school 21 are in the cricket team, 26 are in the hockey team and 29 are in the football team. Among them, 14 play hockey and cricket, 15 play hockey and football, and 12 play football and cricket. Eight play all the three games. The total number of members in the three athletic teams is

(a) 43 (b) 76 (c) 49 (d) None of these

46. In a class of 100 students, 55 students have passed in Mathematics and 67 students have passed in Physics. Then the number of students who have passed in Physics only is **[DCE 1993; ISM Dhanbad 1994]**

(a) 22 (b) 33 (c) 10 (d) 45

47. In a college of 300 students, every student reads 5 newspaper and every newspaper is read by 60 students. The no. of newspaper is

[IIT 1998]

(a) At least 30 (b) At most 20 (c) Exactly 25 (d) None of these

Laws of Algebra of Sets

Basic Level

48. If A and B are two sets, then $A \times B = B \times A$ iff

(a) $A \subseteq B$ (b) $B \subseteq A$ (c) $A = B$ (d) None of these

49. If A, B be any two sets, then $(A \cup B)'$ is equal to

(a) $A' \cup B'$ (b) $A' \cap B'$ (c) $A \cap B$ (d) $A \cup B$

50. If A and B be any two sets, then $(A \cap B)'$ is equal to

(a) $A' \cap B'$ (b) $A' \cup B'$ (c) $A \cap B$ (d) $A \cup B$

51. Let A and B be subsets of a set X. Then

(a) $A - B = A \cup B$ (b) $A - B = A \cap B$ (c) $A - B = A^c \cap B$ (d) $A - B = A \cap B^c$

52. Let A and B be two sets in the universal set. Then $A - B$ equals

(a) $A \cap B^c$ (b) $A^c \cap B$ (c) $A \cap B$ (d) None of these

53. If A, B and C are any three sets, then $A - (B \cap C)$ is equal to

(a) $(A - B) \cup (A - C)$ (b) $(A - B) \cap (A - C)$ (c) $(A - B) \cup C$ (d) $(A - B) \cap C$

54. If A, B, C are three sets, then $A \cap (B \cup C)$ is equal to

(a) $(A \cup B) \cap (A \cup C)$ (b) $(A \cap B) \cup (A \cap C)$ (c) $(A \cup B) \cup (A \cup C)$ (d) None of these

Cartesian Product of Sets

Basic Level

55. If $A = \{1, 2, 4\}$, $B = \{2, 4, 5\}$, $C = \{2, 5\}$, then $(A - B) \times (B - C)$ is

(a) $\{(1, 2), (1, 5), (2, 5)\}$ (b) $\{(1, 4)\}$ (c) $(1, 4)$ (d) None of these

56. If $(1, 3)$, $(2, 5)$ and $(3, 3)$ are three elements of $A \times B$ and the total number of elements in $A \times B$ is 6, then the remaining elements of $A \times B$ are

(a) (1, 5); (2, 3); (3, 5) (b) (5, 1); (3, 2); (5, 3) (c) (1, 5); (2, 3); (5, 3) (d) None of these

57. Let $A = \{1, 2, 3, 4, 5\}$; $B = \{2, 3, 6, 7\}$. Then the number of elements in $(A \times B) \cap (B \times A)$ is

(a) 18 (b) 6 (c) 4 (d) 0

58. $A = \{1, 2, 3\}$ and $B = \{3, 8\}$, then $(A \cup B) \times (A \cap B)$ is

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(a) $\{(3, 1), (3, 2), (3, 3), (3, 8)\}$ (b) $\{(1, 3), (2, 3), (3, 3), (8, 3)\}$ (c) $\{(1, 2), (2, 2), (3, 3), (8, 8)\}$ (d) $\{(8, 3), (8, 2), (8, 1), (8, 8)\}$

59. If $A = \{2, 3, 5\}$, $B = \{2, 5, 6\}$, then $(A - B) \times (A \cap B)$ is

(a) $\{(3, 2), (3, 3), (3, 5)\}$ (b) $\{(3, 2), (3, 5), (3, 6)\}$ (c) $\{(3, 2), (3, 5)\}$ (d) None of these

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Answer Sheet

Assignment (Advance & Basic Level)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
d	b	c	b	d	b	a	c	a	b	b	a	c	b	b	a	a	b	a	a
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
a	c	d	a	c	b	b	c	a	d	a	a	a	c	c	a	c	c	b	a
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	
c	d	c	b	a	d	c	c	b	b	d	a	a	b	b	a	c	b	c	

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