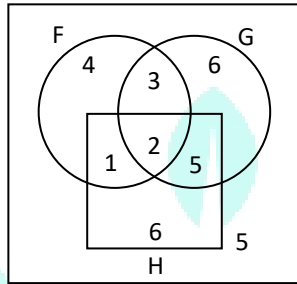
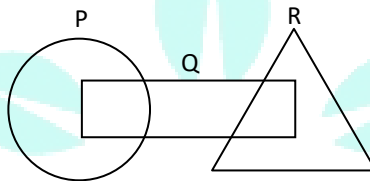




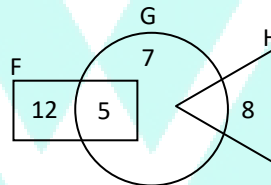
12. In a party, 70 guests were to be served tea or coffee after dinner. There were 52 guests who preferred tea while 37 preferred coffee. Each of the guests liked one or the other beverage. How many guests like both tea and coffee? [     ]  
 A) 15                      B) 18                      C) 19                      D) 33
13. In a certain group of 36 people, only 18 are wearing hats and only 24 are wearing sweaters. If six people are wearing neither a hat nor a sweater, then how many people are wearing both a hat a sweater? [     ]  
 A) 30                      B) 22                      C) 12                      D) 8
14. The number in the Venn diagram represent the number of elements in each subset. Find  $n[(F \cup G) \cap H^c]$  [     ]



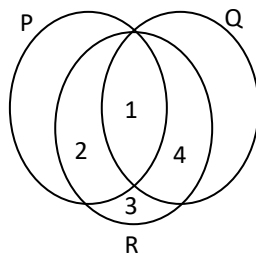
- A) 3                      B) 13                      C) 15                      D) 18
15. P, Q and R are three sets and  $\mu = P \cup Q \cup R$ . Given that  $n(\mu) = 60, n(P \cap Q) = 5, n(Q \cap R) = 10, n(P) = 20$  and  $n(Q) = 23$ , find  $n(P \cup R)$  [     ]



- A) 37                      B) 38                      C) 45                      D) 52
16. In the Venn diagram, the numbers represent the number of elements in the subsets. Given that  $\mu = F \cup G \cup H$  and  $n(\mu) = 42$ , find  $n(G^c \cup H)$  [     ]



- A) 18                      B) 28                      C) 30                      D) 38
17. In the venn diagram, the numbers represent the number of elements in the subsets. Given that  $\mu = P \cup Q \cup R, n(P^c) = 13$  and  $n(P \cup Q) = 18$  find  $n(P \cup R) \cap Q^c$  [     ]



- A) 5                      B) 11                      C) 16                      D) 21
18. Which of the following is a null set? [     ]  
 A)  $\{x: |x| < 1, x \in N\}$                       B)  $\{x: |x| < 5, x \in N\}$   
 C)  $\{x: x^2 = 1, \text{ or } |x| < 1, x \in N\}$                       D)  $\{x: x^2 + 2x + 1 = 0, x \in R\}$



37. Let  $F_1$  be the set of all parallelogram,  $F_2$  the set of rectangles,  $F_3$  the set of rhombuses,  $F_4$  the set of squares and  $F_5$  the set of trapeziums in a plane then  $F_1$  is equal to : [ ]
- A)  $F_2 \cap F_3$                       B)  $F_2 \cup F_3 \cup F_4 \cup F_1$                       C)  $F_3 \cap F_4$                       D) None of these
38. If  $A = \{x \in C: x^2 = 1\}$  and  $B = \{x \in C: x^4 = 1\}$ , then  $A \Delta B$  is equal to : [ ]
- A)  $\{-1, 1\}$                       B)  $\{-1, 1, i, -i\}$                       C)  $\{-i, i\}$                       D) None of these
39. If  $A \subseteq B$ , then  $B' - A'$  is equal to : [ ]
- A)  $A'$                       B)  $B'$                       C)  $A - B$                       D)  $\emptyset$
40. If a set  $A$  has  $n$  distinct elements, the number of all relations on  $A$  is : [ ]
- A)  $2^{n^1}$                       B)  $n^2$                       C)  $2^n$                       D) None of these
41. 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)  $A \cap (B \cup C)$
42. If  $x = \{8^n - 7n - 1 | n \in N\}$  and  $y = \{49^n - 49 | n \in N\}$ . Then, [ ]
- A)  $X \subset Y$                       B)  $Y \subset X$                       C)  $X = Y$                       D)  $X \cap Y = \emptyset$
43. The survey shows that 63% of the people watch a news channel whereas 76% watch another channel. If  $x\%$  of the people watch both channel, then [ ]
- A)  $x = 35$                       B)  $x = 63$                       C)  $39 \leq x \leq 63$                       D)  $x = 39$
44. If  $A = \{1, 3, 5, 7, 9, 11, 13, 15, 17\}$ ,  $B = \{2, 4, 6, \dots, 18\}$  and  $N$  the set of natural number is the universal set, then  $(A' \cup (A \cup B) \cap B')$  is [ ]
- A)  $\emptyset$                       B)  $N$                       C)  $A$                       D)  $B$
45. If  $S = \{x | x \text{ is a positive multiple of 3 less than } 100\}$  and  $P = \{x | x \text{ is a prime number less than } 20\}$ , then  $n(S) + n(P)$  is equal to [ ]
- A) 34                      B) 31                      C) 33                      D) 41
46. Suppose  $A_1, A_2, \dots, A_{30}$  are thirty sets each having 5 elements and  $B_1, B_2, B_n$  are  $n$  set each with 3 elemtns, Let  $\bigcup_{i=1}^{30} A_i = \bigcup_{j=1}^n B_j = S$  and each element of  $S$  belongs to exactly 10 of the  $A_i$ 's and exactly 9 of the  $B_j$ 's. Then  $n$  is equal to : [ ]
- A) 15                      B) 3                      C) 45                      D) 35
47. Two finite sets have  $m$  and  $n$  elements. The number of subsets of the first set is 112 more than that of the second set. The values of  $m$  and  $n$  are, respectively : [ ]
- A) 4, 7                      B) 7, 4                      C) 4, 4                      D) 7, 7
48. If  $R$  be the set of point inside a rectangle of sides  $a$  and  $b (a, b > 1)$  with two sides along the positive direction of  $X$ -axis and  $Y$ -axis, then, [ ]
- A)  $R = \{(x, y): 0 \leq x \leq a, 0 \leq y \leq b\}$                       B)  $R = \{(x, y): \leq 0 x \leq a, \leq 0 y \leq b\}$
- C)  $R = \{(x, y): 0 \leq x \leq a, 0 < y < b\}$                       D)  $R = \{(x, y): 0 < x < a, 0 < y < b\}$
49.                      **Column A**                      **Column B**
- i)  $\{x: x \text{ is prime number and } x \leq 40\}$                       A) the cardinal number of set is 12
- ii)  $\{x: x = 4n - 1 \ n \in IN \text{ and } x \leq 71\}$                       B) it is finite set
- iii)  $\{x: x \in I, x \leq 260 \text{ and divisible by 3 and 7}\}$                       C) the cardinal number of set is 18
- iv)  $\{x: x \text{ is natural divisible by 4 and 6 both and } x < 225\}$                       D) it is an infinite set
50.                      **Column A**                      **Column B**
- i) set of point inside the circle of radius 1 cm                      A) it is a finite set
- ii) set of integer which leave remainder 3 when divided by 4                      B) it is an infinite set
- iii) set of integral point lying inside the square region formed with vertices  $(0, 0), (5, 0), (5, 5), (0, 5)$                       C) it is a countable set
- iv) set of air molecules in the volume  $(V)$                       D) it is an uncountable set

**Comprehension Passage – 1:**

Given  $A = \{x/x = 5m, m \in N \text{ and } x \leq 30\}$ ,  $B = \{y: y = 4k, k \in W \text{ and } k \leq 8\}$  and  $C = \{x: x \text{ is prime number and } x \leq 16\}$ ,  $U = \{x: x \leq 35x \in N\}$ . Where  $W$  is the set of whole numbers and  $N$  is the set of natural numbers. Based on this information, now answer the following questions :

51. Number of elements in  $(A \cup B)$  will be : [     ]  
A) 14                      B) 9                      C) 10                      D) None of these
52. Number of elements in  $(A \cup B \cup C)$  will be : [     ]  
A) 18                      B) 19                      C) 20                      D) None of these
53. Number of elements in  $(A - C)(C - B)$  is equal to [     ]  
A) 11                      B) 9                      C) 12                      D) 10
54. Number of elements in  $A \Delta B$  (The symmetric difference of  $A$  and  $B$ ) [     ]  
A) 10                      B) 13                      C) 9                      D) None of these
55. Number of elements in  $(A \cup B)'$  will be [     ]  
A) 21                      B) 20                      C) 24                      D) None of these
56. Number of elements in  $(A' \cap (B \cup C))$  will be [     ]  
A) 10                      B) 11                      C) 12                      D) 13

**Comprehension Passage – 2 :**

Given  $A = \{x: x = 3m, m \in N \text{ and } x \leq 17\}$ ,  $B = \{y: y = 2k, k \in W \text{ and } k \leq 6\}$  and  $C = \{x: x \text{ is prime number and } x \leq 7\}$ . Where  $W$  is the set of whole numbers and  $N$  is the set of natural numbers. Based on this information now answer the following questions :

57. Number of elements in  $(A \cup B)$  will be [     ]  
A) 9                      B) 6                      C) 8                      D) None of these
58. Number of elements in  $(A \cup B \cup C)$  will be [     ]  
A) 12                      B) 10                      C) 8                      D) None of these
59. Number of elements in  $(A - C) \cup (C - B)$  is equal to [     ]  
A) 6                      B) 7                      C) 8                      D) 10
60. Number of elements in  $A \Delta B$  (The symmetric difference of  $A$  and  $B$ ) [     ]  
A) 12                      B) 10                      C) 8                      D) None of these

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