CLASS XI

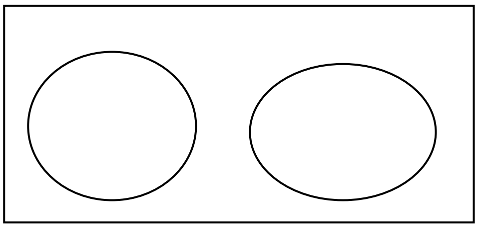
CHAPTER-1

SETS

03 MARKS TYPE QUESTIONS

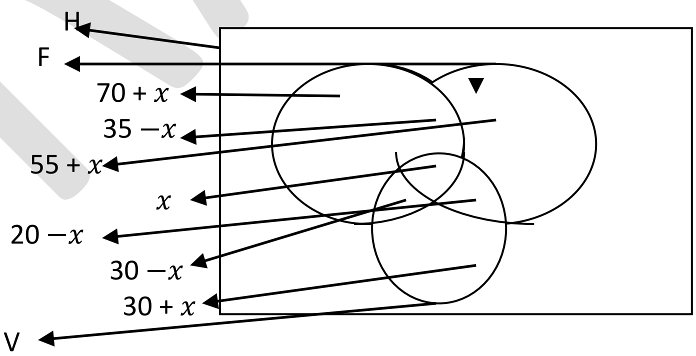
Q. NO	**QUESTION**	**MARK**
1.	For all sets A, B and C, if $A \subset C$ and $B \subset C$, then $A \cup B \subset C$.	3
2.	Let X = {1, 2, 3, 4, 5, 6}. If n represent any member of X, express the following as sets: (i) $n \in X$ but $2n \notin X$ (ii) n + 5 = 8 (iii) n is greater than 4	3
3.	Are the following sets equal? A={x: x is a letter in the word reap}, B={x: x is a letter in the word paper}, C={x: x is a letter in the word rope}.	3
4.	A class teacher Rohan Singh of class XI write three sets A, B and C are such that A = {1, 3, 5, 7, 9}, B = {2, 4, 6, 8} and C = {2, 3, 5, 7, 11}. Answer the following questions which are based On above sets. (i) Find $A \cap B$. (a) {3, 5, 7} (b) ϕ (c) {1, 5, 7} (d) {2, 5, 7} (ii) Find $A \cap C$ (a) {3, 5, 7} (b) ϕ (c) {1, 5, 7} (d) {3, 4, 7} (iii) Which of the following is correct for two sets A and B to be disjoint? (a) $A \cap B = \phi$ (b) $A \cap B \neq \phi$ (c) $A \cup B = \phi$ (d) $A \cup B \neq \phi$	3
5.	The school organized a farewell party for 100 Students and school management decided three Types of drinks will be distributed in farewell party i.e. Milk (M), Coffee (C) and Tea (T). Organizer reported that 10 students had all the three drinks M,C,T. 20 students had M and C; 30 Students had C and T; 25 students had M and T. 12 students had M only; 5 students had C only; 8 Students had T only. Based on the above information, answer the Following questions. (i) The number of students who did not take any drink, is (a) 20 (b) 30 (c) 10 (d) 25 (ii) The number of students who prefer Milk is (a) 47 (b) 45 (c) 53 (d) 50 (iii) The number of students who prefer Coffee is (a) 47 (b) 53 (c) 45 (d)50	3
6.	In a library, 25 students read physics, chemistry and mathematics books. It was found that 15 students read mathematics, 12 students read Physics while 11 students read chemistry. 5	3

	students read both mathematics and chemistry, 9 students read physics and mathematics. 4 students read physics and chemistry and 3 Students read all three subject books. Based on the above information, answer the Following questions. (i) The number of students who are reading only chemistry is (a) 5 (b) 4 (c) 2 (d) 1 (ii) The number of students who are reading only mathematics is (a) 4 (b) 3 (c) 5 (d) 11 (iii) The number of students who are reading only one of the subjects is (a) 5 (b) 8 (c) 11 (d) 6	
7.	If $X = \{4^n - 3n - 1 : n \in N\}\ and\ Y = \{9(n-1) : n \in N\}$, prove that $X \subset Y$	3
8.	A survey shows that 63% of the Indians like cheese whereas 76% like apples. If x% of the Indians like both cheese and apples, find the value of x	3
9.	A market research group conducted a survey of 2000 consumers and reported that 1720 consumers liked product P_1 and 1450 consumers liked product P_2. What is the least number that must have liked both the products?	3
10.	Skow that $n(P\left(P\left(P(\emptyset)\right)\right) = 4$	3
11.	For any two sets A and B prove $A \cap B' = \emptyset \Rightarrow A \subset B$	3
12.	For any two sets A and B, prove $P(A \cap B) = P(A) \cap P(B)$	3
13.	Out of 280 students in class XII, 110 play football, 80 play volley ball, 135 play hockey, 35 of these play hockey and football, 30 play volleyball and hockey, 20 play football and volleyball. Also, each students plays at least one of the three games. How many students play all the three games? 	3
14.	In a survey of 100 persons, it was found that 28 read magazine A, 30 read Magazine B, 42 read magazine C, 8 read magazines A and B , 10 read magazines A and C, 5 read magazines B and C and 3 read all the three magazines. Find How many read magazines C only?	3

		
15.	Two finite sets have m and n elements respectively. The total number of subsets of first set is 56 more than the total number of subsets of the second set. Find the value of m and n. 	3
16.	If X $=\{a, b, c, d\}$ and Y $= \{f, b, d, g\}$, then find (i) X-Y (ii) Y-X (iii) X∩Y	3
17.	If A $= \{x : x = 2n, n \in Z\}$ and B $= \{x : x = 3n, n \in Z\}$ then, find $A \cap B$.	3
18.	Let U = {1,2,3,4,5,6,7,8,9}, A={1,2,3,4}, B = {2,4,6,8}, then find $(A - B)'$.	3

ANSWERS:

Q. NO	ANSWER	MARKS
1.	True According to the question, There are three sets A, B and C To check: if A ⊂ C and B ⊂ C, then A ∪ B ⊂ C is true or false Let x ∈ A ∪ B ⇒ x ∈ A or x ∈ C ⇒ x ∈ C or x ∈ C {∵ A ⊂ C and B ⊂ C} ⇒ x ∈ C ⇒ A ∪ B ⊂ C Hence, the given statement "for all sets A, B and C, if A ⊂ C and B ⊂ C, then A ∪ B ⊂ C" is true.	3
2.	(i) For X = {1, 2, 3, 4, 5, 6}, it is given that n ∈ X, but 2n ∉ X. Let, A = {x | x ∈ X and 2x ∉ X} Now, 1 ∉ A as 2.1 = 2 ∈ X 2 ∉ A as 2.2 = 4 ∈ X 3 ∉ A as 2.3 = 6 ∈ X But 4 ∈ A as 2.4 = 8 ∉ X 5 ∈ A as 2.5 = 10 ∉ X 6 ∈ A as 2.6 = 12 ∉ X Therefore, A = {4, 5, 6} (ii) Let B = {x | x ∈ X and x + 5 = 8} Here, B = {3} as x = 3 ∈ X and 3 + 5 = 8 and there is no other element belonging to X such that x + 5 = 8. (iii) Let C = {x | x ∈ X, x > 4} Therefore, C = {5, 6}	3
3.	For A Letters in word reap A ={R, E, A, P} = {A, E, P, R} For B Letters in word paper B = {P, A, E, R} = {A, E, P, R} For C Letters in word rope C = {R, O, P, E} = {E, O, P, R}. *Set A = Set B* Because every element of set A is present in set B. *But Set C is not equal to either of them because all elements are not present*	3
4.	i)b ii)a iii)a	3
5.	i)c ii)a iii)c	3
6.	i)a ii)a iii)c	3
7.	$x_n = 4^n - 3n - 1 = (1+3)^n - 3n - 1$	3

	$$x_n = 9({}^n_2C + 3.\,{}^n_3C \ldots\ldots)$$ So, $X \subset Y$	
8.	$$n(A \cup B) + n(A \cap B) = 139$$ $$n(A \cup B) \leq 100$$ $39 \leq n(A \cap B) \leq 63$	3
9.	$$n(A \cup B) = 3170 - n(A \cap B)$$ $$n(A \cup B) \leq n(U)$$ $$n(A \cap B) \geq 1170$$	3
10.	As only subset of Ø is Ø so $P(\emptyset) = \{\emptyset\}$ $P(P(\emptyset)) = \{\emptyset, \{\emptyset\}\}$ $P\left(P(P(\emptyset))\right) = \{\emptyset, \{\emptyset\}, \{\{\emptyset\}\}, \{\emptyset, \{\emptyset\}\}$ $n\left(P\left(P(P(\emptyset))\right)\right) = 4$	3
11.	$A = A \cap U$ $= A \cap (B \cup B')$ $= (A \cap B) \cap (A \cap B')$ $= (A \cap B) \cap \emptyset$ $= (A \cap B)$ $\Longrightarrow A \subset B$	3
12.	Let $X \in P(A \cap B) \Leftrightarrow X \subseteq A \cap B$ $\Leftrightarrow X \subseteq A \text{ and } X \subseteq B$ $\Leftrightarrow X \in P(A) \text{ and } X \in P(B)$ $\Leftrightarrow X \in P(A) \cap P(B)$	3
13.	Let H , F and V be the sets of students who play hockey , football and volleyball respectively. Let x be the number of students who play all the three games. It is given that 35 students play hockey and football. So, number of student who play hockey and football only is (35 − x).  Similarly, the number of students playing various games are written in the regions representing them in figure. It is given that each student plays at least one of the three games. ∴ n(H ∪ F ∪ V) = 280 ⇒ (70 + x) + (35 − x) + (30 − x) + x + (20 − x) + (55 + x) + (30 + x) = 280 ⇒ x = 40	3
14.	Given that , 42 read magazine C , 10 read magazines A and C, 5 read magazines B and C and 3 read all the three magazines. 2 persons read magazines B and C only , 7 persons read magazines A and C only. ∴ The no. of persons who read magazine C only is = 42 – (7 + 3 + 2) = 30	3
15.	Let , A and B be two sets having m and n elements respectively. Then , number of subsets of A = 2^m and number of subsets of B = 2^n	3

	Given that , $2^m = 56 + 2^n$ $\Rightarrow\ 2^m - 2^n = 56$ $\Rightarrow\ 2^n(2^{m-n} - 1) = 2^3\ (2^3 - 1)$ $\Rightarrow$ n = 3 and m – n = 3 $\Rightarrow$ n=3 and m=6	
16.	{a, c} {f, g}	
17.	$\{x : x = 6n, n \in Z\}$	
18.	{1,2,5,6,7,8,9}	