JEE Mains & Advanced Past Years Questions

JEE-MAIN
PREVIOUS YEARS
SET

1. Two sets A and B are as under

$A = \{(a, b) \in R \times R : |a-5| < 1 \text{ and } |b-5| < 1\}$;

$B = \{(a, b) \in R \times R : 4(a-6)^2 + 9(b-5)^2 \le 36\}$

Then— **[JEE Main-2018]**

(a) $A \subset B$ (b) $A \not\subset B = \phi$ (an empty set)

(c) neither $A \subset B$ nor $B \subset A$

(d) $B \subset A$

2. In a class of 140 students numbered 1 to 140, all even numbered students opted Mathematics course, those whose number is divisible by 3 opted Physics course and those whose number is divisible by 5 opted Chemistry course. Then the number of students who did not opt for any of the three courses is: **[JEE Main-2019 (January)]**

(a) 102 (b) 42

(c) 1 (d) 38

3. Let $S = \{1,2,3,\ldots\ldots, 100\}$. The number of non-empty subsets A of S such that the product of elements in A is even is : **[JEE Main-2019 (January)]**

(a) $2^{100} - 1$ (b) $2^{50}(2^{50} - 1)$

(c) $2^{50} - 1$ (d) $2^{50} + 1$

4. Let Z be the set of integers. If $A = \{X \in Z : 2^{(x+2)(x^2-5x+6)} = 1\}$ and $B = \{x \in Z : -3 < 2x - 1 < 9\}$, then the number of subsets of the set $A \times B$, is : **[JEE Main-2019 (January)]**

(a) 2^{15} (b) 2^{18}

(c) 2^{12} (d) 2^{10}

5. Two newspapers A and B are published in a city. It is known that 25% of the city populations reads A and 20% reads B while 8% reads both A and B. Further, 30% of those who read A but not B look into advertisements and 40% of those who read B but not A also look into advertisements, while 50% of those who read both A and B look into advertisements. Then the percentage of the population who look into advertisement is: **[JEE Main-2019 (April)]**

(a) 12.8 (b) 13.5

(c) 13.9 (d) 13

6. Let A, B and C be sets such that $\phi \ne A \cap B \subseteq C$. Then which of the following statements is not true? **[JEE Main-2019 (April)]**

(a) If $(A - C) \subseteq B$ then $A \subseteq B$

(b) $(C \cup A) \cap (C \cup B) = C$

(c) If $(A - B) \subseteq C$, then $A \subseteq C$

(d) $B \cap C \ne \phi$

7. Let $X = \{n \in N : 1 \le n \le 50\}$. If $A = \{n \in X$: n is a multiple of 2$\}$; $B = \{n \in X$: n is a multiple of 7$\}$, then the number of elements in the smallest subset of X containing both A and B is _____. **[JEE Main-2020 (January)]**

8. If $A = \{x \in R : |x| < 2\}$ and $B = \{|x-2| \ge 3\}$: then: **[JEE Main-2020 (January)]**

(a) $A - B = [-1, 2)$

(b) $A \cup B = R - (2, 5)$

(c) $B - A = R - (-2, 5)$

(d) $A \cap B = (-2, -1)$

9. Let S be the set of all integer solutions, (x, y, z), of the system of equations **[JEE Main-2020 (September)]**

$x - 2y + 5z = 0$

$-2x + 4y + z = 0$

$-7x + 14y + 9z = 0$

such that $15 \le x^2 + y^2 + z^2 \le 150$. Then, the number of elements in the set S is equal to _____.

10. Consider the two sets: **[JEE Main-2020 (September)]**

$A = \{m \in R$: both the roots of $x^2 - (m+1)x + m + 4 = 0$ are real$\}$ and $B = [-3, 5)$.

Which of the following is not true?

(a) $A \cap B = \{-3\}$ (b) $B - A = (-3, 5)$

(c) $A \cup B = R$ (d) $A - B = (-\infty, -3) \cup (5, \infty)$

11. Let $\bigcup_{i=1}^{50} X_i = \bigcup_{i=1}^{n} Y_i = T$ where each X_i contains 10 elements and each Y_i contains 5 elements. If each element of the set T is an element of exactly 20 of sets X_i's and exactly 6 of sets Y_i's, then n is equal to **[JEE Main-2020 (September)]**

(a) 50 (b) 15

(c) 30 (d) 45

12. A survey shows that 63% of the people in a city read newspaper A whereas 76% read newspaper B. If x% of the people read both the newspapers, then a possible value of x can be : [*JEE Main-2020 (September)*]

(*a*) 37 (*b*) 55

(*c*) 29 (*d*) 65

13. A survey shows that 73% of the persons working in an office like coffee, whereas 65% like tea. If x denotes the percentage of them, who like both coffee and tea, then x cannot be : [*JEE Main-2020 (September)*]

(*a*) 63

(*b*) 36

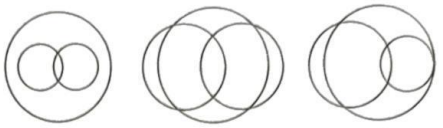
(*c*) 38

(*d*) 54

14. Set A has m elements and Set B has n elements. If the total number of subsets of A is 112 more than total number of subsets of B, then the value of $m \cdot n$ is —.

[*JEE Main-2020 (September)*]

15. In a school, there are three types of games to be played. Some of the students play two types of games, but none play all the three games. Which Venn diagrams can justify the above statement? [*JEE Main-2021*]



(*a*) P and Q (*b*) P and R

(*c*) None of these (*d*) Q and R

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1. (*a*) **2.** (*d*) **3.** (*b*) **4.** (*a*) **5.** (*c*) **6.** (*a*) **7.** [29] **8.** (*c*) **9.** [8] **10.** (*d*) **11.** (*c*) **12.** (*b*)
13. (*b*) **14.** [28.00] **15.** (*c*)