MATHS

BOOKS - S CHAND IIT JEE FOUNDATION

SETS

Solved Examples

1. Which of the following sets is non-empty ?

A. Set of odd prime numbers less than 3

B. $A = \{x \mid x + 4 = 0, x \in N\}$

C. $B = \{x \mid 4 < x < 5, x \in W\}$

D. C = Set of even prime numbers

Answer: D

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2. Which of the following pairs of sets are not equal ?

A. $A = \{1, 3, 3, 1\}, B = \{1. 4\}$

B. $A = \{x \mid x + 4 = 4\}, B = \{0\}$

C.

$$A = \{m, a, t, h, e, i, c, s\}, B = \{a, m, t, h, e, i, c, s\}$$

D.

$$A = \{1, 4, 9, 16, 25, \ldots\} B = \left\{x \mid x = n^2, n \in N\right\}$$

Answer: A

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3. Let $n(U) = 700, \quad n(A) = 200, n(B) = 300$ and $n(A \cap B) = 100$, then find $n(A' \cap B')$

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4. If a community of 175 persons , 40 read TOI, 50 read the Samachar Patrika and 100 do not read any How many persons read both the papers

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5. In a locality , two thirds of the people have Cable TV, one -fifh have Dish TV and one - tenth have both . What is the fraction of people having either Cable TV or Dish TV ?

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Question Bank

1. Consider the given diagram 500 candidate appeared in an examination conducted for the tests in English , Hindi and Maths represented by the circle E H and M respectively . the diagram M gives the number of candidates who failed in different tests ?

A. Singleton set

B. null set

C. infinite set

D. disjoint set

Answer: B

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2. Which of the following statements is true

A. $\phi \subset \{a, b, c\}$

B. $\phi \in \{a, b, c\}$

C. $0 \in \phi$

D. $\{a\} \in \{a, b, c\}$

Answer: A

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3. The sets A { x | x is prime, $x < 20$ } and

b = {x | x = n^2, $n \in N$ and $x < 5$ } are :

A. overlapping sets

B. equal sets

C. equivalent sets

D. disjoint sets

Answer: D

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4. Let A = {Multiples of 3 less than 20}

B = {multiples of 5 less than 20 }

Then , $A \cap B$

A. {3, 5}

B. 15

C. {15}

D. ϕ

Answer: C

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5. Let A = {set of prime numbers less than 10 } ; B = {factors of 36 less than 10}

Then , AUB =

A. {2, 3, 4, 6, 9, 12, 18}

B. {1, 2, 3, 4, 5, 6, 7, 8, 9}

C. {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}

D. {1, 2, 3, 4, 5, 6, 7, 9}

Answer: D

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6. Let A = {even numbers } , b = { prime numbers } Then , $A \cap B$ equals

A. {odd number

B. {composite number}

C. {2}

D. {whole number

Answer: C

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7. If A = {1, 2, 3, 4} , then B = {2, 4, 5, 6} and C = {1, 2, 5, 7, 8} , then $(A \cup C) \cap B$ is equal to :

A. {1, 2, 5}

B. {2, 4, 5}

C. {1, 2, 4, 5, 7, 8}

D. {1, 2, 3, 4, 5, 7, 8}

Answer: B

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8. A and B are two sets such that $A \cup B$ has 18 elements . If A has 8 elements and B has 15 elements, in $A \cap B$ will be

A. 5

B. 8

C. 7

D. 4

Answer: A

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9. if X and Y are two sets , then $X \cap (Y \cup X)'$ equals

A. X

B. Y

C. ϕ

D. {0}

Answer: C

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10. Let P = {x | x is multiple of 3 and less than 100 $x \in N$ }

Q = {x | is a multiple of 10 and less than 100, $x \in N$ }

Then which of the following statements is true ?

A. $Q \subset P$

B. $P \cup Q$ = {x | x is multiple of 30 , $x \in N$ }

C. $P \cap Q = \phi$

D. $P \cap Q$ = {x } is multiple of $30, x \in N$}

Answer: D

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11. Let P = Set of all integral multiples of 3

Q = set of all integral multiples of 4

R = Set of all integral multiples of 6

consider the following relations :

1 $P \cup Q = R$

2. $P \subset R$

$R \subset (P \cup Q)$

Which of the relations given above is/are correct ?

A. only 1

B. only 2

C. only 3

D. 2 and 3

Answer: C

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12. If P = $\{2m : m \in N\}$ and $Q = \{2^m : m \in N\}$, where m is positive, then :

A. $Q \subset P$

B. $P \subset Q$

C. P = Q

D. $P \cup Q = N$

Answer: A

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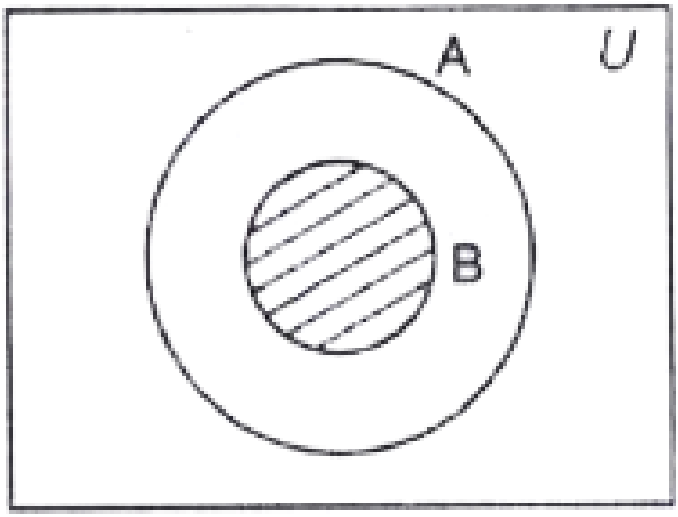
13. The shaded region in the diagram is



A. $A \cup B$

B. A'

C. B'

D. $A \cap B$

Answer: D

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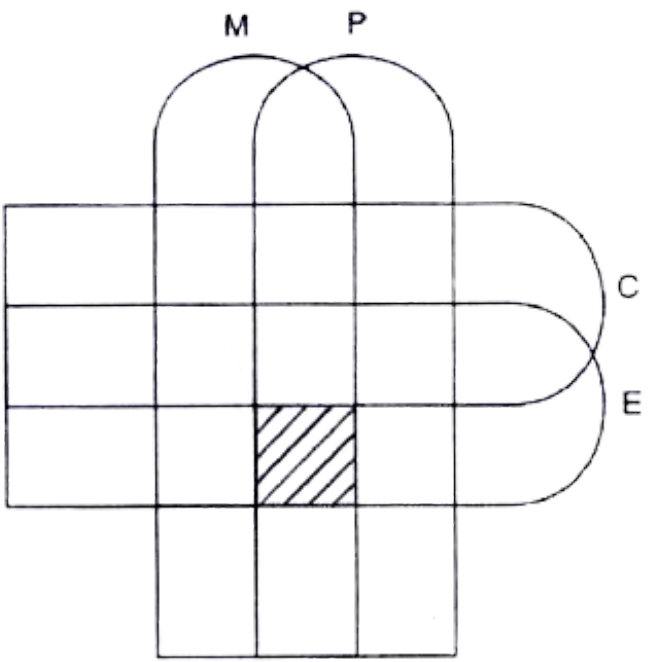
14. The given Venn diagram represents four sets of students who have opted for Mathematics (M) physics (P) , Chemistry (C) and Electronics (E)



What does the shaded region represent ?

A. Students who opted for Physics, Chemistry and Electronics

B. Studnts who opted for Mathematics, Physics, Chemistry

C. Students who opted for Mathematics, Physics and Electronics

D. Studetns who opted for Mathematics, Chemistry and Electronics

Answer: C

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15. Complete the following table by filling the empty boxes.

Changing miles into kilometers.

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16. If $A \cap B = A$ and $B \cap C = B$, then $A \cap C$ is equal to :

A. B

B. C

C. $B \cup C$

D. A

Answer: D

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17. The Venn diagram showing the relationship $X \subset Y \subset U$ is

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18. Let A = $\{x \mid x \in N$, x is a multiple of 2 $\}$

B = $\{x \in N$, x is a multiple of 5 $\}$

C = $\{x \mid x \in N$, x is a multiple of 10 $\}$

The set $(A \cap B) \cap C$ is equal to

A. A

B. $A \cap C$

C. B

D. C

Answer: D

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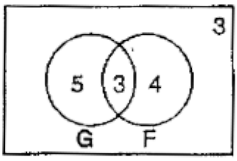
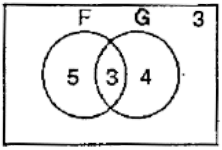
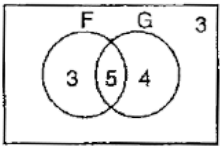
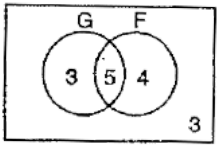
19. In a group of 15, 7 have studied German, 8 have studied French and 3 have not studied either . The Venn diagram showing the number of students who have studied both is

A. 

B. 

C. 

D. 

Answer: B

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20. In a class of 60 students, 40 students play cricket and only 30 students play football . The number of students who can play both cricket and football is

A. 10

B. 23

C. 33

D. 34

Answer: A

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21. In a class of 50 students, 35 opted for Mathematics and 37 opted for Biology . How have opted for only Mathematics ? (Assume that each student has to opt for at least one of the subjects)

A. 15

B. 17

C. 13

D. 19

Answer: C

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22. There are 19 hockey players in a club. On a particular day, 14 were wearing the hockey shirts prescribed. None of them were without either hockey pants or shirts. Eleven were wearing the prescribed hockey pants. How many were in complete uniform ?

A. 8

B. 6

C. 9

D. 7

Answer: B

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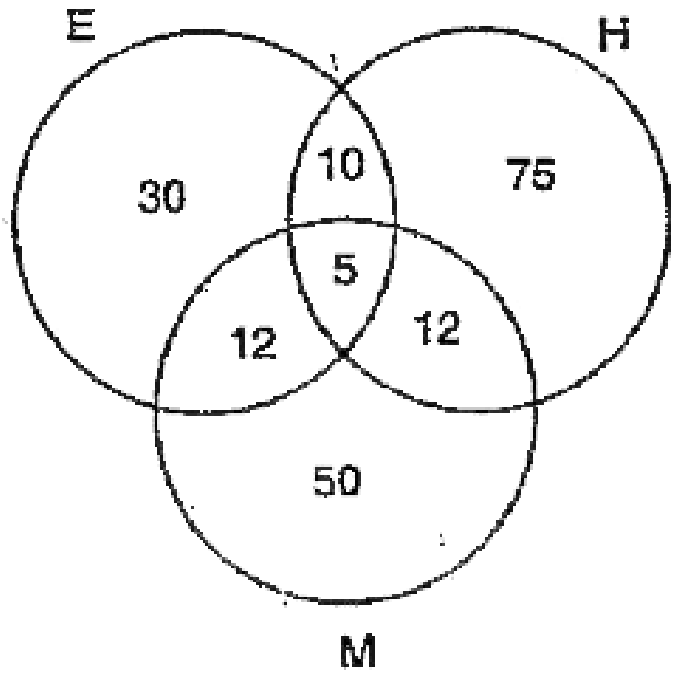
23. Consider the given diagram 500 candidate appeared in an examination conducted for the tests in English , Hindi and Maths represented by the circle E H and M respectively . the diagram gives the number of candidates who failed in different tests ?

What is the percentage of candidates who failed in

atleast two subjects ?



A. 0. 078

B. 1. 0

C. 6. 8

D. 7. 8

Answer: D

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24. In an examination 70% students passed both in Mathematics and Physics, 85% passed in Mathematics and 80% passed in Physics. If 30 studetns have failed in both the subjects , then the total number of students who appeared in the examination is equal to

A. 900

B. 600

C. 150

D. 100

Answer: B

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Self Assessment Sheet

1. If X' = Y then $(X \cap Y)'$ is equal to

A. ϕ

B. X

C. U

D. Y

Answer: C

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2. Which of the following is a singleton set ?

A. $\{x : x^2 = 5, x \in Z\}$

B. $\{x : |x| = 2, x \in N\}$

C. $\{x : |x| = 7, x \in Z\}$

D. $\{x : x^2 + 4x + 4 = 0, x \in Z\}$

Answer: B, D

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3. If A has 5 elements and B has 8 elements such that $A \subset B$ then the number of elements in $A \cap B$ and $A \cup B$ are respectively :

A. 8, 5

B. 3, 3

C. 5, 8

D. 5, 13

Answer: C

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

A. $\{21x : x \in N\}$

B. $\{42x : x \in N\}$

C. $\{63x : x \in N\}$

D. None of these

Answer: A

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5. In a group of 100 persons 85 take tea 20 take coffee and 25 take tea and coffee . Number of persons who take neither tea nor coffee is

A. 5

B. 15

C. 25

D. 20

Answer: D

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6. Which of the following cannot have a proper subset ?

A. $\{x : x \in Q, 5 < x < 7\}$

B. $\{x : x \in Z, -4 < x < 4\}$

C. $\{x : \in N, 5 < x < 6\}$

D. $\{x : x + 1 = 0, x \in Z\}$

Answer: C

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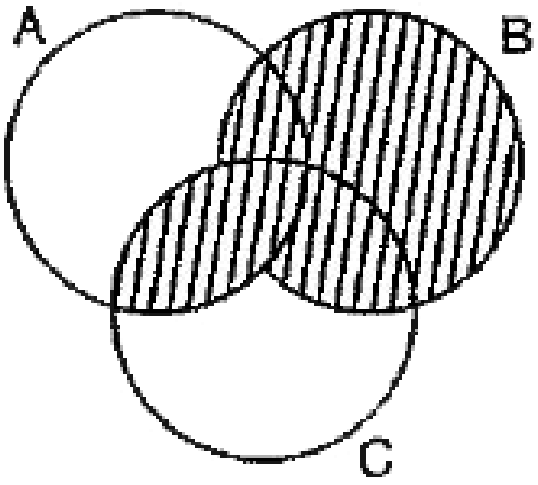
7. The relationship illustrated by the given Venn diagram is



A. $(A \cup B) \cap B$

B. $(A \cap B) \cap C$

C. $(A \cap C) \cup B$

D. $(A \cup B)' \cap C$

Answer: C

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8. If A,B and C are three sets such that $A \cap B = A \cap C$ and $A \cup B = A \cup C$ then

A. A = B

B. B = C

C. A = C

D. A = B = C

Answer: B

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9. If U = {3, 4, 5, 6, 7,8, 9} X = {3, 4}, Y = {5, 6} and Z = {7, 8, 9} then $Y' \cap (X \cap Z)'$ is equal to

A. $X \cup Y$

B. $Y \cup Z$

C. $(X \cup Z)'$

D. $X' \cap Y'$

Answer: C

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10. Out of 450 students in a school , 193 students read Science Today , 200 students read Science Refresher, while 80 students read neither. How many students read both the magazines ?

A. 137

B. 80

C. 57

D. 23

Answer: D

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