



## MATHS

### BOOKS - DHANPAT RAI & CO MATHS (HINGLISH)

## SETS

#### Illustration

1. which of the following collection is a set ?
- A. the collection of all girls in your class.
  - B. the collection of intelligent girls in your class.
  - C. the collection of beautiful girls in your class
  - D. the collection of tall girls in your class.

**Answer: A**



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2. If  $B$  is the set whose elements are obtained by adding 1 to each of the even numbers, then the set builder notation of  $B$  is

A.  $B = \{x : x \text{ is even} \}$

B.  $B = \{x : x \text{ is odd prime and } x \in Z\}$

C.  $B = \{x : x \text{ is odd and } x \in z \}$

D.  $B = \{x : x \text{ is an integer} \}$

**Answer: C**



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3. Which of the following collection is a null set ?

A.  $\{x : x \text{ is a real number and } x^2 - 1 = 0\}$

B.  $\{x : x \text{ is a real number and } x^2 + 1 = 0\}$

C.  $\{x : x \text{ is a real number and } x^2 - 9 = 0\}$

D.  $\{x : x \text{ is a real number and } x^2 = x + 2\}$

**Answer: B**



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4. which of the following sets is not finite ?

$\{(x, y) : x^2 + y^2 \leq 1 \leq x + y, x, y \in \mathbb{R}\}$

A.  $\{(x, y) : x^2 + y^2 \leq 1 \leq x + y, x, y \in \mathbb{R}\}$

B.  $\{(x, y) : x^2 = + y^2 \leq 1 \leq x + y, x, y \in \mathbb{Z}\}$

C.  $\{(x, y) : x^2 \leq y \leq |x|, x, y \in \mathbb{Z}\}$

D.  $\{(x, y) : x^2 \leq y \leq |x|, x, y \in \mathbb{Z}\}$

**Answer:**



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5. The collection of intelligent students in a class is :

- A. a null set
- B. a singleton set
- C. a finite set
- D. not a well defined collection

**Answer: D**



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6. If  $X = \{8^n - 7n - 1 : n \in N\}$  and

$Y = \{49(n - 1) : n \in N\}$ , then

- A.  $X \subset Y$
- B.  $Y \subset X$
- C.  $X = Y$

D. None of these

**Answer: A**



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7. If  $A = \{x : x = 2n + 1, n \in \mathbb{Z}\}$  and  $B = \{x : x = 2n, n \in \mathbb{Z}\}$  then

$A \cup B =$

A.  $\mathbb{N}$

B.  $\mathbb{Z}$

C.  $\mathbb{R}$

D.  $\mathbb{R}_0$

**Answer: B**



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8. If  $A = \{x : x = 4n, n \in \mathbb{Z}\}$  and  $B = \{x : x = 6n, n \in \mathbb{Z}\}$ , then  $A \cap B =$

A.  $\{x : x = 40n, n \in \mathbb{Z}\}$

B.  $\{x : x = 12n, n \in \mathbb{Z}\}$

C.  $\{x : x = 2n, n \in \mathbb{Z}\}$

D.  $\{x : x = 48n, n \in \mathbb{Z}\}$

**Answer: B**



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## Section I Solved Mcqs

1. Let A and B be two sets such that  $A \text{ belongs } \rightarrow B$ . Then  $A \cap B$  is equal to

A.  $\phi$

B. B

C. A

D. none of these

**Answer: B**



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2. in a college of 300 students , every student reads 5 newspapers and every newspaper is read by 60 students . The number newspapers is

A. at least 30

B. At most 20

C. exactly 25

D. none of these

**Answer: C**



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3. Let A and B be two sets . The  $(A \cup B)' \cup (A' \cap B) =$

A.  $A'$

B. A

C.  $B'$

D. none of these

**Answer: A**



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4.  $(A - B) \cup (B - A) = ?$

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

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

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



D.  $(A - B) \cap (A - B)$

**Answer: C**



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5. 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.  $B^c$

**Answer: A**



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

A.  $A=B$

B.  $B=C$

C.  $A=C$

D.  $A=B=C$

**Answer: B**



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7. Let  $A$  and  $B$  be two sets that  $A \cap X = B \cap X = \phi$  and  $A \cup X = B \cup X$  for some set  $X$ . then

A.  $A=B$

B.  $A=X$

C.  $B=X$

D.  $A \cup B = X$

**Answer: A**



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8. Let  $A, B, C$  be three sets such that  $A \cup B \cup C = U$ , where  $U$  is the universal set. 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.  $A \cap (B \cup C)$

**Answer:**



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9. The sets  $S$  and  $E$  are defined as given below:

$$S = \{(x, y) : |x - 3| < 1 \text{ and } |y - 3| < 1\} \text{ and}$$

$$E = \{(x, y) : 4x^2 + 9y^2 - 32x - 54y + 109 \leq 0\}.$$

Show that  $S \subset E$ .

A.  $A \subset B$

B.  $B \subset A$

C.  $A = B$

D. none of these

**Answer:**



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10. if  $A = \{(x, y) : x^2 + y^2 \leq 1, x, y \in R\}$  and

$B = \{(x, y) : x^2 + y^2 \leq x^2 + y^2 \leq 4, x, y \in R\}$  then

A.  $A - B = A$

B.  $B - A = B$

C.  $A - B = \phi$

D.  $B - A = \phi$

**Answer:**



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11. if  $A = \{\theta : 2 \cos^2 \theta + \sin \theta \leq 2\}$  and

$B = \left\{ \theta : \frac{\pi}{2} \leq \theta \leq \frac{3\pi}{2} \right\}$ , then  $A \cap B$  is equal to

A.  $\{\theta : \pi/2 \leq \theta \leq 5\pi/6\}$

B.  $\{\theta : \pi \leq \theta \leq 3\pi/2\}$

C.  $\left\{ \theta : \pi/2 \leq \theta \leq 5\frac{\pi}{6} \right\} \cup \left\{ \theta : \pi \leq \theta \leq 3\pi/2 \right\}$

D. none of these

**Answer:**



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

A. 12

B. 8

C. 16

D. none of these

**Answer: B**



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13. A market research group conducted a survey of 2000 consumers and reported that 1720 consumers liked product  $P_1$  and 1450 consumers liked products  $P_2$  the least number of consumers who must have liked both the products is

- A. 1170
- B. 3170
- C. 270
- D. none of these

**Answer: A**



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14. A college awarded 38 medals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 men and only three men

got medals in all the three sports, how many received medals in exactly two of the three sports?

A. 18

B. 15

C. 9

D. 6

**Answer: C**



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**15.** In a class of 55 students the number of students studying subjects are , 23 in Mathematics 24 in physics 19 in chemistry 12 in Mathematics and physics ,9 in Mathematics and chemistry ,7 in physics and chemistry and 4 in all the three subjects.

the number of students who have taken exactly one subject is

A. 6



B. 9

C. 7

D. none of these

**Answer: D**



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16. If  $A = \{x, y : x^2 + y^2 = 25\}$  and

$B = \{(x, y) : x^2 + 9y^2 = 144\}$ , then  $A \cap B$  contains

A. one point

B. three point

C. two point

D. four point

**Answer: D**



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17. If  $n(A) = 10$ ,  $n(B) = 6$  and  $n(C) = 5$  for three disjoint sets  $A, B, C$  then  $n(A \cup B \cup C)$  equals

A. 21

B. 11

C. 1

D. 9

**Answer: A**



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18. In a certain town 25% families own a cellphone, 15% families own a scooter and 65% families own neither a cellphone nor a scooter. If 500 families own both a cellphone and scooter, then total number of families in the town is

A. 1 and 2

B. 1 and 3

C. 2 and 3

D. 1,2 and 3

**Answer:**



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19. Three sets  $A$ ,  $B$  and  $C$  are such that  $A = B \cap C$  and  $B = C \cap A$

A.  $A \subset B$

B.  $A \supset B$

C.  $A = B$

D.  $A \subset B$

**Answer: C**



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20. If  $A = \{x, y\}$ , then the power set of  $A$  is

- A.  $\{2^2\}$
- B.  $\{\phi, x, y\}$
- C.  $\{\phi, \{x\}, \{2y\}\}$
- D.  $\{\phi, \{x\}, \{y\}, \{x, y\}\}$

**Answer: D**



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21. the intersection of all the intervals having the form

$$\left[1 + \frac{1}{n}, 6, -\frac{2}{n}\right], \text{ where } n \text{ is a positive integer is}$$

- A.  $[1,6]$
- B.  $(1,6)$

C. [2,4]

D.  $[3/2, 5]$

**Answer:**



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22. The value of  $(A \cup B \cup C) \cap (A \cap B^c \cap C^c) \cap C^c$  is

A.  $B \cap C'$

B.  $B' \cap C'$

C.  $B \cap C$

D.  $A \cap B \cap C$

**Answer:**



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23. Q. Let  $P = \{\theta : \sin \theta - \cos \theta = \sqrt{2} \cos \theta\}$  and  $Q = \{\theta : \sin \theta + \cos \theta = \sqrt{2} \sin \theta\}$  be two sets. then

A.  $P \subset Q$  and  $Q - P = \phi$

B.  $Q \not\subset P$

C.  $B \cap C$

D.  $A \cap B \cap C$

**Answer:**



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24. If A and B two sets containing 2 elements and 4 elements, respectively. Then, the number of subsets of  $A \times B$  having 3 or more elements, is

A. 256

B. 220

C. 219

D. 211

**Answer:**



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## Exercise

1. A survey shows that 63% of the Indians like cheese, whereas 76% like apples. If  $x$  % of the Indians like both cheese and apples, then  $x$  can be

A.  $x=39$

B.  $x=63$

C.  $39 \leq x \leq 63$

D.  $x=36$

**Answer: C**



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2. In a battle, 70 % of the combatants lost one eye, 80 % an arm, 75 % an arm. 85 % a leg, and  $x$  % lost all the four organs. Then minimum value of  $x$  is

A. 10

B. 12

C. 15

D. 15

Answer: A



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3. if  $A = \{1, 2, 5, 7, 9, 11, 13, 15, 17, \}$  and  $B = \{2, 4, \dots, 18\}$  and  $N$  is the universal set, then  $A \cup ((A \cup B) \cap B')$  is



A. A

B. N

C. B

D.  $\phi$

**Answer: B**



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4. If  $A = \{4^n - 3n - 1 : n \in N\}$  and  $B = \{9(n - 1) : n \in N\}$

then

A. X

B. Y

C. N

D. Z

**Answer: B**



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5. if set A and B are defined as  $A = \{(x, y) : y = e^x, x \in R\}$

$B = \{(x, y) : y = x, x \in R\}$ . then

A.  $B \subset A$

B.  $A \subset B$

C.  $A \cap B = \phi$

D.  $A \cup B = A$

Answer: C



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6. 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.  $A \cap B = \{(0, 1)\}$

C.  $A \cup B = R^2$

D.  $A \cap B = \{(0, 0)\}$

**Answer: B**



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7. Suppose  $A_1, A_2, \dots, A_{30}$  are thirty sets each with five elements and  $B_1, B_2, \dots, B_n$  are  $n$  sets elements such that  $\bigcup_{i=1}^{30} A_i = \bigcup_{i=1}^n B_i$

and exactly 9 of the  $B_j$ 's then the value of  $n$ , is

A. 15

B. 135

C. 45

D. 90

**Answer: C**



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8. IF sets A and B are defined as  $A = \left\{ (x, y) : y = \frac{1}{x}, 0 \neq x \in R \right\}$

$B = \{(x, y) : y = -x, x \in R\}$ , then

A.  $A \cap B = A$

B.  $A \cap B = B$

C.  $A \cap B = \phi$

D. none of these

Answer: C



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9. if  $a \in N = \{ax : xi \in N\}$  and  $b \in N \cap c \in N$ , where  $b, c$  in  $N$  are relatively prime, then

A.  $d = bc$

B.  $c = bd$

C.  $b = cd$

D.  $a = bcd$

**Answer: A**

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10. If  $aN = \{ax \mid x \in N\}$  and  $bN \cap cN = dN$ , where  $b, c \in N$ , then

A.  $d=bc$

B.  $c= bd$

C.  $b=cd$

D.  $d=\text{LCM}(c \text{ and } b)$

**Answer: D**

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11. In a town of 10,000 families it was found that 40% family buy newspaper A, 20% buy newspaper B and 10% families buy newspaper C, 5% families buy A and B, 3% buy B and C and 4% buy A and C. If 2% families buy all the three newspapers, then find the number of families which buy A only

A. 3100

B. 3300

C. 2900

D. 1400

**Answer: B**



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12. In a town of 10000 families, it was found that 40% families buy newspaper A, 20% families buy newspaper B, 10 % families buy

newspaper C, 5% families buy A and B, 3% buy B and C and 4 % buy A and C. If 2% families buy all the three newspaper. Find the number of families which buy none of A , B and C.

A. 4000

B. 3300

C. 4200

D. 5000

**Answer: A**



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**13.** Consider the set A of all matrices of order  $3 \times 3$  with entries 0 or 1 only. Let B be the subset of A consisting of all matrices whose determinant is 1. Let C be the subset of A consisting of all matrices whose determinant is -1. Then which one of the following is correct ?

A. C is empty

B. B has as many element as C

C.  $A = B \cup C$

D. B has twice as many elements as C.

**Answer: B**



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14. if A and B are two sets , then  $A \cap (A \cup B)$  equals

A. A

B. B

C.  $\phi$

D.  $A \cap B$

**Answer: A**



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15. if  $n(A) = n$ , then  $P(A)$  has

- A.  $2n$  elements
- B.  $2^n$  elements
- C.  $n$  elements
- D. none of these

**Answer: B**



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16. 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

**Answer: C**



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17. Let  $A$  and  $B$  have 3 and 6 elements respectively , what can be the minimum number of elements in  $A \cup B$ ?

A. 3

B. 6

C. 9

D. 18

**Answer: B**



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18. Two finite sets have  $m$  and  $n$  elements . The total number of subsets of the first set is 56 more than the total number of subsets of the

second set , the values of  $m$  and  $n$  are

A.  $m = 7, n = 6$

B.  $m = 6, n = 3$

C.  $m = 5, n = 1$

D.  $m = 8, n = 7$

**Answer: B**



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

A.  $X$

B.  $Y$

C.  $\phi$

D. none of these

**Answer: C**



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**20.** Let  $A = \{x : x \text{ is a multiple of } 3\}$  and  $B = \{x : x \text{ is a multiple of } 5\}$   
then  $A \cap B$  is given by

A.  $\{3, 6, 9, \dots\}$

B.  $\{5, 10, 15, 20, \dots\}$

C.  $\{15, 30, 45, \dots\}$

D. none of these

**Answer: C**



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**21.** Let  $A = \{1, 2, 3\}$ ,  $B = \{3, 4\}$ ,  $C = \{4, 5, 6\}$ . then  $A \cup (B \cap C)$  is

A.  $\{3\}$

B.  $\{1, 2, 3, 4\}$

C.  $\{1, 2, 5, 6\}$

D.  $\{1, 2, 3, 4, 5, 6\}$

**Answer: B**



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**22.** 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 a subset of complement of B

B. B is a subset of A

C. A and B are Disjoint

D. A and the complement of B are non-disjoint .

**Answer: D**



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23. Let  $U$  be the universal set for sets  $A$  and  $B$  such that  $n(A) = 200$ ,  $n(B) = 300$  and  $n(A \cap B) = 100$ . then  $n(A' \cap B')$  is equal to 300, provided that  $n(U)$  is equal to

A. 600

B. 700

C. 800

D. 900

**Answer: B**



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24. 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. 160

B. 240

C. 216

D. 128

**Answer: A**



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**25.** From 50 students taking examinations in mathematics, physics and chemistry, 37 passed mathematics, 24 physics and 43 chemistry. At most 19 passed mathematics and physics, at most 29 mathematics and chemistry and at most 20 physics and chemistry. Find the largest possible number that could have passed all three exams.

A. 11

B. 12

C. 13

D. 14

**Answer: D**



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**26.** Let  $Z$  be the set of all integers and

$$A = \{(a, b) : a^2 + 3b^2 = 28, a, b \in Z\}$$

$$\text{and } B = \{(a, b) : a > b \in Z\}$$

then the number of elements in  $A \cap B$ , is

A. 2

B. 4

C. 6



D. 5

**Answer: C**



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27. In a class of 35 students, 17 have taken Mathematics, 10 have taken mathematics but not economics if each student has taken either mathematics OR Economics or both, then the number of students who have taken Economics but not mathematics is

A. 7

B. 25

C. 18

D. 32

**Answer: C**



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28. if  $A = \left\{ (x, y) : y = \frac{4}{x}, x \neq 0 \right\}$  and

$B = \{(x, y) : x^2 + y^2 = 8, x, y \in R\}$ , then

A.  $A \cap B = \phi$

B.  $A \cap B$  contains one point only

C.  $A \cap B$  contains two points only

D.  $A \cap B$  is a multiple of 4 points only .

**Answer: C**



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29. if  $A = \{x : x \text{ is multiple of } 4\}$  and

$B = \{x : x \text{ is a multiple of } 6\}$ , then  $A \cap B$  consists of multiples of

A. 16

B. 12

C. 8

D. 4

**Answer: B,D**



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30. if  $A = \{(x, y) : x^2 + y^2 = 4, x, y \in R\}$  and

$B = \{(x, y) : x^2 + y^2 = 9, x, y \in R\}$ , then

A.  $A - B = \phi$

B.  $B - A = B$

C.  $A \cap B \neq \phi$

D.  $A \cap B = A$

**Answer: B**



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31. if  $A = \{(x, y) : x^2 + y^2 = 4, x, y \in R\}$  and

$B = \{(x, y) : Y = |x|, x, y \in R\}$  then

A.  $A \cap B = \phi$

B.  $A \cap B$  is singleton set

C.  $A \cap B$  contains two elements only

D.  $A \cap B$  contains three elements only .

**Answer: C**



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32. if  $A = \left\{ \theta : \cos \theta > -\frac{1}{2}, 0 \leq \theta \leq \pi \right\}$  and

$B = \left\{ \theta : \sin \theta > \frac{1}{2}, \frac{\pi}{3} < \theta \leq \pi \right\}$  then

A.  $A \cap B = \{\theta : \pi/3 \leq \theta \leq 2\pi/3\}$

B.  $A \cap B = \{\theta : -\pi/3 \leq \theta \leq 2\pi/3\}$

C.  $A \cap B = \{\theta: -5\pi/6 \leq \theta \leq 5\pi/6\}$

D.  $A \cup B = \{\theta: 0 \leq \theta \leq \pi/6\}$

**Answer: A**



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33. in rule method the null set is resresented by

A.  $\{0\}$

B.  $\Phi$

C.  $\{x: x \neq x\}$

D.  $\{x: x = x\}$

**Answer: C**



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34. if A and B are two given sets , then  $A \cap (A \cap B)^c$  is equal to

A. A

B. B

C.  $\Phi$

D.  $A \cap B^c$

Answer: D



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35. Let  $n(Li) = 700$  , $n(A) = 200$ , $n(B) = 300$  and  $n(A \cap B) = 100$  then

$n(A^c \cap B^c) =$

A. 400

B. 600

C. 300

D. 200

**Answer: C**



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36. if  $A = \{x : x \text{ is a multiple of } 3\}$  and ,

$B = \{x : x \text{ is a multiple of } 5\}$ , then  $A-B$  is

A.  $\overline{A} \cap B$

B.  $A \cap \overline{B}$

C.  $\overline{A} \cap \overline{B}$

D.  $\overline{A \cap B}$

**Answer: B**



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37. For any three sets  $A_1, A_2, A_3$ , let  $B_1 = A_1, B_2 = A_2 - A_1$  and  $B_3 = A_3 - (A_1 \cup A_2)$ , then which one of the following statement is always true

A.  $A_1 \cup A_2 \cup A_3 \supset B_1 \cup B_2 \cup B_3$

B.  $A_1 \cup A_2 \cup A_3 = B_1 \cup B_2 \cup B_3$

C.  $A_1 \cup A_2 \cup A_3 \subset B_1 \cup B_2 \cup B_3$

D. none of these

**Answer: A**



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38. In a city 20 % of the population travels by car, 50 % by bus and 10 % travels by both car and bus. Then persons travelling by car or bus is-

A. 0.8



B. 0.4

C. 0.6

D. 0.7

**Answer: C**



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39. An investigator interviewed 100 students to determine the performance of three drinks: milk, coffee and tea. The investigator reported that 10 students take all three drinks (milk, coffee and tea), 20 students take coffee, 25 students take milk only, 5 students take coffee only and 8 students take tea only. Then the number of students who did not take any of these drinks is

A. 10

B. 20

C. 25

D. 30

**Answer: B**



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40. two finite sets have  $m$  and  $n$  elements . The total number of subsets of the first set is 56 more than the total number of subsets of the second set , the values of  $m$  and  $n$  are :

A. 7,6

B. 6,3

C. 6,4

D. 7,4

**Answer: C**



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41. In a class of 175 students the following data shows the number of students opting one or more subjects Mathematics 100, physics 70, chemistry 28, physics and Chemistry 23, mathematics physics and chemistry 18. how many students have offered mathematics alone ?

A. 35

B. 48

C. 60

D. 22

**Answer: C**



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42. if  $A = \{1, 2, 3, 4, 5\}$ ,  $B = \{2, 4, 6\}$  and  $C = \{3, 4, 6\}$ , then

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

A.  $\{3,4,6\}$

B. {1,2,3}

C. {1,4,3}

D. none of these

**Answer: A**



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**43.** In a class of 45 student, 22 can speak hindi and 12 can speck English only ,Find the number of students , who can speak both Hindi and English -

A. 9

B. 11

C. 23

D. 17

**Answer: B**



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44. In a certain town 25% families own a cellphone, 15% families own a scooter and 65% families own neither a cellphone nor a scooter. If 500 families own both a cellphone and scooter, then total number of families in the town is

- A. 10000
- B. 20000
- C. 30000
- D. 40000

**Answer: A**



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45. Let  $A$  be a set represented by the squares of natural numbers and  $x, y$  are any two elements of  $A$  then

A.  $x - y = \in A$

B.  $xy \in A$

C.  $x + y \in A$

D.  $\frac{x}{y} \in A$

**Answer: B**



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## Chapter Test

1. Which of the following cannot be the number of elements in the power set of any finite set ?

A. 26

B. 32

C. 8

D. 16

**Answer: A**



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2. If  $A = \{1, 2, 3, 4\}$ , then the number of subsets of set A containing element 3, is

A. 24

B. 28

C. 8

D. 16

**Answer: C**



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3. If  $A = \{1, 2, 3, 4\}$ , then the number of subsets of  $A$  that contain the element 2 but not 3, is

A. 16

B. 4

C. 8

D. 24

**Answer: B**



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4. If  $n(u) = 100$ ,  $n(A) = 50$ ,  $n(B) = 20$  and  $n(A \cap B) = 10$ , then  $n\{(A \cup B)^c\}$

A. 60



B. 30

C. 40

D. 20

**Answer: C**



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5. Let  $Z$  denoted the set of integers, then

$$\{x \in Z: |x - 3| < 4\} \cap \{x \in Z: |x - 4| < 5\} =$$

A.  $\{-1, 0, 1, 2, 3, 4\}$

B.  $\{-1, 0, 1, 2, 3, 4, 5\}$

C.  $\{0, 1, 2, 3, 4, 5, 6\}$

D.  $\{-1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$

**Answer: C**



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6. If  $A_n$  is the set of first  $n$  prime numbers, then  $\bigcup_{n=2}^{10} A_n =$

- A. {2, 3, 5, 7, 11, 13, 17, 19}
- B. {2, 3, 5, 7, 11, 13, 17, 19, 23, 29}
- C. {3, 5}
- D. {2, 3}

**Answer: B**



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7. if  $n$  is a set of prime numbers then the value of  $10 \cup n = 2 A n =$

- A. {3, 5, 7, 11, 13, 17, 19}
- B. {2, 3, 5}
- C. {2,3,5,7,11,13,17,19,23,29}

D.  $\{3, 5, 7\}$

**Answer: C**



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8. Let  $A_1, A_2, A_3, \dots, A_{100}$  be 100 sets such that  $n(A_i) = i + 1$  and  $A_1 \subset A_2 \subset A_3 \subset \dots \subset A_{100}$ , then  $\bigcup_{i=1}^{100} A_i$  contains... elements

A. 99

B. 100

C. 101

D. 102

**Answer: C**



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9. If  $A$  and  $B$  are two sets such that  $n(A) = 7$ ,  $n(B) = 6$  and  $(A \cap B) \neq \phi$  Then the greatest possible value of  $n(A \Delta B)$  is

A. 11

B. 12

C. 13

D. 10

**Answer: A**



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10. If  $A$  and  $B$  are two sets such that  $n(A) = 7$ ,  $n(B) = 6$  and  $(A \cap B) \neq \phi$  The least possible value of  $n(A \Delta B)$ , is

A. 1

B. 7

C. 6

D. 13

**Answer: A**



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11. If  $A_1, A_2, \dots, A_{100}$  are sets such that  $n(A_i) = i + 2$ ,  $A_1 \subset A_2 \subset A_3 \dots \subset A_{100}$  and  $\bigcap_{i=3}^{100} A_i = A$ , then  $n(A) =$

A. 3

B. 4

C. 5

D. 6

**Answer: C**



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12. If  $A, B$  and  $C$  are three non-empty sets such that  $A$  and  $B$  are disjoint and the number of elements contained in  $A$  is equal to those contained in the set of elements common to the set  $A$  and  $C$ , then  $n(A \cup B \cup C)$  is necessarily equal to

A.  $n(B \cup C)$

B.  $n(A \cup C)$

C. both a and b

D. none of these

**Answer: B**



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13. If  $A = \left\{ n : \frac{n^3 + 5n^2 + 2}{n} \text{ is an integer} \right\}$ , then the number of elements in the set  $A$ , is

A. 1

B. 2

C. 3

D. 4

**Answer: D**



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14. If  $\left\{ p \in N : p \text{ is a prime and } p = \frac{7n^2 + 3n + 3}{n} \text{ for some } n \in N \right\}$ ,

then the number of elements in the set A, is

A. 1

B. 2

C. 3

D. 4

**Answer: A**



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**15.**  $A$ ,  $B$  and  $C$  are three non-empty sets. If  $A \subset B$  and  $B \subset C$  then which the following is true?

A.  $B - A = C - B$

B.  $A \cap B \cap C = B$

C.  $A \cup B = B \cap C$

D.  $A \cup B \cup C = A$

**Answer: C**



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**16.** If  $A = [1, 2, 3, 4, 5, 6]$  then how many subsets of  $A$  contain the element 2, 3 and 5?



A. 4

B. 8

C. 16

D. 32

**Answer: B**



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17. If  $S$  is the set of squares and  $R$  is the set of rectangles, then

$(S \cup R) - (S \cup S)$  is

A.  $S$

B.  $R$

C. set of squares but not rectangles

D. set of rectangles but not squares

**Answer: D**



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18. If  $P$  is the set of all parallelogram, and  $T$  is the set of all trapeziums, then  $P \cap T$  is

A.  $P$

B.  $T$

C.  $\phi$

D. none of these

Answer: A



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19. If  $n(A \cap B) = 10$ ,  $n(B \cap C) = 20$  and  $n(A \cap C) = 30$ , then the greatest possible value of  $n(A \cap B \cap C)$  is

A. 15

B. 20

C. 10

D. 4

**Answer: C**



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20. If  $n(A \cap B) = 5$ ,  $n(A \cap C) = 7$  and  $n(A \cap B \cap C) = 3$ , then the minimum possible value of  $n(B \cap C)$  is

A. 0

B. 1

C. 3

D. 2

**Answer: C**



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21. A and B are any two non-empty sets and A is proper subset of B. If

$n(A) = 5$ , then find the minimum possible value of  $n(A\Delta B)$

A. is 1

B. is 5

C. cannot be determined

D. none of these

**Answer: A**



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22. If A, B and C are three non-empty sets such that any two of them

are disjoint, then  $(A \cup B \cup C) \cap (A \cap B \cap C) =$

A. A

B. B

C. C

D.  $\Phi$

**Answer: D**



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**23.**

If

$$A = \left\{ p: p = \frac{(n+2)(2n^5 + 3n^4 + 4n^3 + 5n^2 + 6)}{n^2 + 2n}, np \in \mathbb{Z}^+ \right\}$$

then the number of elements in the set A, is

A. 2

B. 3

C. 4

D. 6

**Answer: C**



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**24.** If  $A$ ,  $B$  and  $C$  are three sets such that  $A \supset B \supset C$ , then

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

A.  $A - B$

B.  $B - C$

C.  $A - C$

D. none of these

**Answer: C**



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25. If  $A_1 \subset A_2 \subset A_3 \subset \dots \subset A_{50}$  and  $n(A_x) = x - 1$ , then find

$$n \left[ \bigcap_{x=11}^{50} A_x \right]$$

A. 99

B. 98

C. 100

D. 10

**Answer: D**



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26. If  $n(A_i) = i + 1$  and  $A_1 \subset A_2 \subset \dots \subset A_{99}$ , then  $n \left( \bigcup_{i=1}^{99} A_i \right) =$

A. 21

B. 7

C. 100

D. 14

**Answer: C**



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27. In a class, 70 students wrote two tests viz, test-I and test-II 50% of the students failed in test I and 40% of the students in test -II. How many students passed in both tests?

A. 21

B. 7

C. 28

D. 14

**Answer: B**



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28. In an election, two contestants A and B contested  $x\%$  of the total voters voted for A and  $(x+20)\%$  for B. If 20% of the voters did not vote, then  $x$  is

A. 30

B. 25

C. 40

D. 35

**Answer: A**



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29. In a rehabilitation programme, a group of 50 families were assured new houses and compensation by the government. Number of families who got both is equal to the number of families who got neither of the two. The number of families who got new house is 6 greater than the

number of families who got compensation. How many families got houses?

A. 22

B. 28

C. 23

D. 25

**Answer: B**



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**30.** In an office, every employee likes at least one of tea, coffee and milk. The number of employees who like only tea, only coffee, only milk and all the three are all equal. The number of employees who like only tea and coffee, only coffee and milk and only tea and milk are equal and each is equal to the number of employees who like all the three. Then a possible value of the number of employees in the office is

A. 65

B. 90

C. 77

D. 85

**Answer: C**



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