

# MATHS

# **BOOKS - DISHA PUBLICATION MATHS (HINGLISH)**

# **SETS**

Jee Main 5 Years At A Glance

1. Let
$$S=ig\{x\in R\colon x\ge 0 ext{ and } 2\mid ig(\sqrt{x}-3\mid +\sqrt{x}ig(\sqrt{x}-6ig)+6=0ig\}$$

then S (1) is an empty set (2) contains exactly one element (3) contains exact;y two elements (4) contains exactly four elements

A. contains exactly one element.

B. contains exactly two elements

C. contains exactly four elements

D. is an empty set

## Answer: B

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2. If 
$$f(x)+2figg(rac{1}{x}igg)=3x, x
eq 0$$
 and  $S=\{x\in R\colon f(x)=f(-x)\}, ext{ then } S$ 

A. contains exactly two elements

B. contains more than two elements

C. is an empty set

D. contains exactly one element

### Answer: A

$$P = ig\{ heta\!:\!\sin heta-\cos heta=\sqrt{2}\cos hetaig\} ext{ and } Q = ig\{ heta\!:\!\sin heta+\cos heta=\sqrt{2}\sin hetaig\}$$

be two sets. Then

A.  $P \subset Q$  and  $Q - P \neq \phi$ B.  $Q \swarrow P$ C. P = QD.  $P \swarrow Q$ 

#### Answer: C

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4. In a certain town, 25% of the families own a phone and 15% own a car,
65% families own neither a phone nor a car and 2,000 families own both
a car and a phone. Consider the following three statements :
(A) 5% families own both a car and a phone
(B) 35% families own either a car or a phone

(C) 40,000 families live in the town

Then,

- A. Only (A) and (C) are correct
- B. Only (B) and (C) are correct

C. All (A), (B) and (C) are correct

D. Only (A) and (B) are correct

## Answer: C

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5. The relation on the set  $A=\{x|x|<3,x,\ \in Z\}$  is defined by  $R=\{(x,y);y=|x|,x
eq-1\},$  Then the numbers of elements in the

power set of R is

A. 32

B. 16

C. 8

#### Answer: B

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6. Let  $X=\{1,2,3,4,5\}$  . The number of different ordered pairs (Y, Z) that can be formed such that  $Y\subseteq X,Z\subseteq X$  and  $Y\cap Z$  is empty, is (1)  $5^2$  (2)  $3^5$  (3)  $2^5$  (4)  $5^3$ 

A.  $5^2$ 

 $\mathsf{B.}\,3^5$ 

 $\mathsf{C}.\,2^5$ 

D.  $5^3$ 

#### Answer: B

7. If A, B and C are three sets such that  $A\cap B=A\cap C$  and  $A\cup B=A\cup C$ , then (1) A=B (2) A=C (3) B=C (4)  $A\cap B=arphi$ 

A. A = C

 $\mathsf{B}.\,B=C$ 

 $\mathsf{C}.\,A\cap B=\phi$ 

 $\mathsf{D}.\, A=B$ 

#### Answer: B

**D** Watch Video Solution

Exercise 1 Concept Builder

1. If A={a,b,c}, then what is the number of proper subsets of A?

A. 3

B. 8

C. 6

D. 7

## Answer: D

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2. Consider the following sets.  
I. 
$$A = \{1, 2, 3\}$$
  
II.  $B = \{x \in R : x^2 - 2x + 1 = 0\}$   
III.  $C = \{1, 2, 2, 3\}$   
IV.  $D = \{x \in R : x^3 - 6x^2 + 11x - 6 = 0\}$ 

Which of the following are equal?

A. 
$$A = B = C$$
  
B.  $A = C = D$   
C.  $A = B = D$   
D.  $B = C = D$ 

## Answer: B

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**3.** 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 value of m and n is

A. 7, 6

B. 6, 3

C. 5, 1

D. 8, 7

Answer: B

**4.** Let A and B be two non empty subsets of set X such that A is not a subset of B, then: (a) A is a subset of the 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

A. A is a subset of the 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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**5.** If  $A = \{x, y\}$ , then the power set of A is

A.  $\{x^y, y^x\}$ 

 $\mathsf{B}.\left\{\phi,x,y\right\}$ 

 $\mathsf{C}.\,\{\phi,\,\{x\},\,\{2y\}\}$ 

D. 
$$\{\phi, \{x\}, \{y\}, \{x, y\}\}$$

Answer: D

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**6.** Given the sets  $A = \{1, 3, 5\}, B = \{2, 4, 6\}$  and  $C = \{0, 2, 4, 6, 8\},$ which of the following may be considered as universal set(s) for all the three sets A,B and C? (i)  $\{0, 1, 2, 3, 4, 5, 6\}$ (ii)  $\phi$ (iii)  $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ (iv)  $\{1, 2, 3, 4, 5, 6, 7, 8\}$ . A.  $\{0, 1, 2, 3, 4, 5, 6\}$ **Β**. φ

 $\mathsf{C}.\ \{0,\,1,\,2,\,3,\,4,\,5,\,6,\,7,\,8,\,9,\,10\}$ 

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

#### Answer: C



**7.** Find the pairs of equal sets from the following sets, if any, giving reasons:

 $egin{aligned} A &= \{0\}, \ B &= \{x\!:\!x > 15 \ and \ x < 5\}, \ C &= \{x\!:\!x - 5 = 0\}, \ D &= \{x\!:\!x^2 \ E &= \{x\!:\!x & ext{is an integral positive root of the equation} \ x^2 - 2x - 15 &= 0\} \,. \end{aligned}$ 

A. A and B

B. C and D

C. C and E

D. B and C

#### Answer: C

**8.** Let  $A=\{1,3,5\}$  and B = { $x\!:\!x$  is an odd natural number less than 6}.

Then, which of the following are true?

 $\mathsf{I}.\,A\subset B\,\mathsf{II}.\,B\subset A$ 

III. A = B IV. A B

A. I and II are true

B. I and III are true

C. I, II and III are true

D. I, II and IV are true

Answer: C

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9. the collection of intellgent 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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10. If  $A = \{1, 2, (3, 4), 5\}$ , then which of the following statements is incorrect?

A. (3, 4) is an element of A

B.  $\{5\}, \{(3, 4)\}$  are subsets of A

C.  $\{1,2\},\{5\}$  are subsets of A

D.  $\{(1,2),(3,4),5\}$  is subset of A

#### Answer: C

**11.** State which of the following sets are finite sets or infinite. In case of finite set, mention the order of cardinal number

(i) 
$$A = (x:x ext{ is a prime number and } x < 15)$$
  
(ii)  $B = (x:x \in N, ext{ and } 3x + 2 = 11)$   
(iii)  $C = (x:x \in N ext{ and } x^2 - 14x + 3 = 0)$   
(iv)  $D = (1, 2, 3, 4....)$ 

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#### 12. Which of the following statement is FALSE

A. If 
$$A = \{x: x^2 = 4, x \in N\}, B = \{-2\}$$
 then  $A \neq B$   
B. If  $A = \{x: |x| < 2, x \in I\}, B = \{-1, 1\}$ , then A = B  
C. If  $A = \{1, 2, 3, 4, 5\}, B = \{2, 1, 3, 3, 4, 4, 5\}$  then A = B  
D. If  $A = \{x: x^2 - 5x + 7 = 0, x \in R\}$  and  $B = \phi$ , then A = B

#### Answer: B

**13.** The set {x : x is a positive integer less than 6 and  $3^x - 1$  is an even number} in roster form is

A.  $\{1, 2, 3, 4, 5\}$ 

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

 $C. \{2, 4, 6\}$ 

D.  $\{1, 3, 5\}$ 

Answer: A

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**14.** The cardinality of the set  $P\{P[P(\phi)]\}$  is

A. 0

B. 1

C. 2

D. 4

#### Answer: D

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15. The number of elements in the set  $ig\{(a,b)\!:\!2a^2+3b^2=35.\ a.\ b\in Zig\}$ 

,where Z is the set of all integers, is

A. 2

B. 4

C. 8

D. 12

## Answer: C

16. If  $A=ig\{x\!:\!x=n^2,n=1,2,3ig\}$  , then number of proper subsets is

B. 8 C. 7

A. 3

D. 4

## Answer: C

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17. Let A, B, C be three sets. If  $A \in B \, ext{ and } \, B \subset C$  then

A.  $A \subset C$ 

 $\mathsf{B}.A \swarrow C$ 

 $\mathsf{C}.\,A\in C$ 

 $\mathsf{D}.A \not \in C$ 

## Answer: B

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#### Answer: A



19. If  $P=\{x\in R\colon f(x)=0\}$  and  $Q=\{x\in R\colon g(x)=0\}$ , then  $P\cup Q$ 

A. 
$$\{x \in R : f(x) + g(x) = 0\}$$
  
B.  $\{x \in R : f(x)g(x) = 0\}$   
C.  $\left\{x \in R : (f(x))^2 + (g(x))^2 = 0
ight\}$ 

D. None of these

#### Answer: B

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**20.** If 
$$A = \{1, 2, 3, 4\}, B = \{2, 3, 5, 6\}$$
 and  $C = \{3, 4, 6, 7\}$ , then

A. 
$$A - (B \cap C) = \{1, 3, 4\}$$

B. 
$$A - (B \cap C) = \{1, 2, 4\}$$

C. 
$$A-(B\cap C)=\{2,3\}$$

D. 
$$A-(B\cap C)=\{\phi\}$$

#### Answer: B

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**21.** If the set A and B are as follows :

$$A = \{1, 2, 3, 4\}, B = \{3, 4, 5, 6\},$$
 then  
A.  $A - B = \{1, 2\}$   
B.  $B - A = \{5\}$   
C.  $[(A - B) - (B - A)] \cup A = \{1, 2\}$   
D.  $[(A - B) - (B - A)] \cup A = \{3, 4\}$ 

#### Answer: A

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22. Consider the following relations :

1. 
$$A-B=A-(A\cap B)$$

2.  $A = (A \cap B) \cup (A - B)$ 

$$\mathbf{3.}A-(B\cup C)=A(A-C)\cup(A-C)$$

## which of these is/are correct

A. I and III

B. I and II

C. Only II

D. II and III

Answer: B

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23. If  $A = \{x \in R : 0 < x < 3\}$  and  $B = \{x \in R : 1 \le x \le 5\}$  then  $A \Delta B$  is

A.  $\{x \in R : 0 < x < 1\}$ 

 $\mathsf{B.}\left\{x\in R\!:\!3\leq x\leq 5\right\}$ 

C.  $\{x \in R : 0 < x < 1 ext{ or } 3 \le x \le 5\}$ 

D.  $\phi$ 

#### Answer: C

**24.** Let X and Y be two non-empty sets such that  $X \cap A = Y \cap A = \phi$  and  $X \cup A = Y \cup A$  for some non-empty set A. Then

A. X is a proper subset of Y

B. Y is a proper subset of X

C. X = Y

D. X and Y are disjoint sets

## Answer: C

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**25.** The set  $(A \, / \, B) \cup (B \, / \, A)$  is equal to

A.  $\left[A \,/\, (A \cap B)
ight] \cap \left[B \,/\, (A \cap B)
ight]$ 

 $\mathsf{B.}\left( A\cup B\right) /\left( A\cap B\right)$ 

 $\mathsf{C}.\,A\,/\,(A\cap B)$ 

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

#### Answer: B

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**26.** if A ={x:x is a multiple of 3 } and ,

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

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

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

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

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

Answer: B

27. If A and B are two sets prove that  $A \cap (B-A) = \phi$ 

A.  $\phi$ 

B. A

С. В

D. None of these

#### Answer: A



**28.** Each student in a class of 40, studies at least one of the subjects English, Mathematics and Economics.16 study English, 22 Economics and 26 Mathematics, 5 study English and Economic, 14 Mathematics and Economics and 2 study all the three subjects. The number of students who study English and Mathematics but not Economics is

A. 7	
B. 5	
C. 10	

## Answer: B

D. 4

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## **29.** If A and B are two sets, then $(A \cup B)' \cup (A' \cap b)$ is equal to

A. A'

B. A

C. B'

D. None of these

## Answer: A

**30.** If  $A = \{1, 2, 5\}$  and  $B = \{3, 4, 5, 9\}$ , then  $A \Delta B$  is equal to

A.  $\{1, 2, 5, 9\}$ 

B. {1, 2, 3, 4, 9}

 $C. \{1, 2, 3, 4, 5, 9\}$ 

D. None of these

#### Answer: B

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**31.** Let X = {Rani, Geeta, Akbar} be the set of students of Class XI who are in school hockey team. Let Y = {Geeta, David, Ashok} be the set of students from Class XI who are in the school football team. Find  $X \cup Y$  and interpret the set

A. {Ram, Geeta}

B. {Ram}

C. {Geeta}

D. None of these

## Answer: C

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**32.** Let 
$$A = \{3, 6, 9, 12, 15, 18, 21\}$$
  
 $B = \{4, 8, 12, 16, 20\}$   
 $C = \{2, 4, 6, 8, 10, 12, 14, 16\}$   
and  $D = \{5, 10, 15, 20\}$   
Which of the following is incorrect?  
I.  $A - B = \{4, 8, 16, 20\}$   
II.  $(C - B) \cap (D - B) = \phi$   
III.  $B - C \neq B - D$ 

A. Only I and II

B. Only II & III

C. Only III & I

D. None of these

Answer: A

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**33.** 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. 128

B. 216

C. 240

D. 160

Answer: D

**34.** Let  $A = \{(n, 2n) : n \in N\}$  and  $B = \{(2n, 3n) : n \in N\}$ . What is  $A \cap B$  equal to ?

A.  $\{(n,6n)\!:\!n\in N\}$ 

 $\mathsf{B.}\left\{(2n,6n)\!:\!n\in N\right\}$ 

C. 
$$\{(n,3n)\!:\!n\in N\}$$

D.  $\phi$ 

#### Answer: D

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**35.** If A is the set of all divisors of the number 15. B is the set of prime numbers smaller than 10 and C is the set of even number smaller than 9, then find the value of  $(A \cup C) \cap B$ 

A. {1, 3, 5}
B. {1, 2, 3}
C. {2, 3, 5}
D. {2, 5}

Answer: C



**36.** let  $\mu$ = the set of all triangles, P = the set of all isosceles triangles, Q = the set of all equilateral triangles, R = the set of all right-angled triangles. What do the sets  $P \cap Q$  and R-P represents respectively ?

A. The set of isosceles triangles, the set of non-isosceles right angled

triangles

- B. The set of isosceles triangles, the set of right angled triangles
- C. The set of equilateral triangles, the set of right angled triangles
- D. The set of isosceles triangles, the set of equilateral triangles

## Answer: A



**37.** If 
$$U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}, A = \{1, 2, 3, 5\}, B = 2, 4, 6, 7\}$$
  
and  $C = \{2, 3, 4, 8\}$ . Then  
(i)  $(B \cup C)$  ' is . . . . . . , (ii)  $(C - A)$  ' is . . . . . .  
A.  $(B \cup C)$  ' =  $\{1, 5, 9, 10\}$   
B.  $(C - A)$  ' =  $\{1, 2, 3, 5, 6, 7, 9, 10\}$   
C. Both (a) and (b)  
D. None of these

## Answer: C

**38.** if a N= $\{ax : xi \in N\}$  and  $bN \cap cN$ , where b,c in N`are relatively

#### prime, then

A. d = bc

 $\mathsf{B.}\, c=bd$ 

C. b=cd`

D. None of these

#### Answer: A

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

A. 400

B. 600

C. 300

D. None of these

#### Answer: C



**40.** A market research group conducted a survey of 2000 consumers and reported that 1720 consumers liked product  $P_1$  and 1450 consumers like product  $P_{2^{-}}$  What is the least number that must have liked both the products?

A. 1150

B. 2000

C. 1170

D. 2500

Answer: C

**41.** In a college of 300 students, every student reads 5 newspapers and every newspaper is read by 60 students. The number of newspaper is -

A. at least 30

B. at most 20

C. exactly 25

D. None of these

### Answer: C



**42.** In a class of 55 students, the number of students studying different 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. Find the number of students who have taken exactly one subject.

A. 6

B. 9

C. 7

D. All of these

Answer: D

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**43.** In a battle, 70 % of the combatants lost one eye, 80 % an are, 75 % an arem. 85 % a leg, and x % lost all the four organs. Then minimum value of x is

A. 10

B. 12

C. 15

D. None of these

## Answer: A

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**44.** In a city 20 percent of the population travels by car, 50 percent travels by bus and 10 percent travels by both car and bus. Then persons travelling by car or bus is

A. 80 percent

B. 40 percent

C. 60 percent

D. 70 percent

## Answer: C

**45.** 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. 4400

B. 3300

C. 2000

D. 500

## Answer: B



**46.** A class has 175 students. The following data shows the number of students obtaining one or more subjects. Mathematics 100, Physics 70, Chemistry 40, Mathematics and Physics 30, Mathematics and Chemistry

28, Physics and Chemistry 23, Mathematics, Physics and Chemistry 18. How many students have offered Mathematics alone (a) 35 (c) 60 (b) 48 (d) 22

A. 35 B. 48 C. 60

D. 22

## Answer: C

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**47.** There are 20 students in a chemistry class and 30 students in a physics class. If ten students are to be enrolled in both the courses, then the number of students which are either in physics class or chemistry class is

A. 50, if two classes meet at the same hour

B. 40, if two classes meet at different hours

C. both (a) and (b) correct

D. (a) correct but (b) incorrect

Answer: C

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**48.** In a statistical investigation of 1003 families of Calcutta, it was found that 63 families has neither a radio nor a T.V, 794 families has a radio and 187 has T.V. The number of families in that group having both a radio and a T.V is

A. 36

B. 41

C. 32

D. None of these

Answer: B



**49.** If A and B are two sets, then  $(A \cup B)' \cup (A' \cap b)$  is equal to

A.  $A^c$ 

 $\mathsf{B}.\,B^c$ 

C. A

D. None of these

#### Answer: A



**50.** 60 employees in an office were asked about their preference for tea and coffee. It was observed that for every 3 people who prefer tea, there are 2 who prefer coffee. For every 6 people who prefer tea, there are 2 who drink both of tea and coffee. For every 6 people who prefer tea, there are 2 who drink both of tea and coffee. The number of people who drink both is the same as those wo drink neither. How many people drink both tea adn coffee?

A. 10 B. 12 C. 14

D. 16

## Answer: B

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**51.** A market research group conducted a survey of 1000 consumers and reported that 720 consumers like product A and 450 consumers like product B. what is the least number that must have liked both products?

A. 170

B. 280

C. 220

D. None

Answer: A



**52.** In a class of 30 students 12 take needle work, 16 take physics and 18 take history. If all the 30 students take at least one subject and no one takes all three, then the number of students taking 2 subjects is

A. 16

B. 6

C. 8

D. 20

#### Answer: A

**53.** Out of 1000 boys in a college, 220 played cricket, 250 played hockey and 350 played basketball. Of the total 80 played both basketball and hockey, 100 played cricket and basketball and 50 played cricket and hockey, 30 played all three games. The number of boys who play atleast one game is :

A. 500

B. 590

C. 600

D. 620

#### Answer: D

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**54.** If X and Y are two sets such that  $(X \cup Y)$  has 60 elements, X has 38 elements and Y has 42 elements, how many elements does  $(X \cap Y)$  have?

A. 11

B. 20

C. 13

D. None of these

Answer: B

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**55.** In a town of 840 persons , 450 persons read Hindi, 300 read English and 200 read both. Then, the number of persons who read neither, is

A. 210

B. 290

C. 180

D. 260

Answer: B

**56.** In a B School there are 15 teachers who teach marketing or finance. Of these, 8 teach finance and 4 teach both marketing and finance. How many teach marketing but not finance?

A. 15

B. 20

C. 11

D. None of these

## Answer: C

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**57.** In a school there are 100 students 60 of them don't like Chocolate and 50 don't like Biscuit and 10 of them like none then how many of them like

both?

A. 20

B. 30

C. 40

D. None of these

Answer: D

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**Exercise 2 Concept Applicator** 

**1.** In a market research project 20% opted for Nirma detergent whereas 60% opted for surf Blue detergent. The remaining individual as ere not certain. If the difference between those who opted for surf blue and those who were uncertain as 720, how many respondents were covered in the surveys? 1440 b. 3600 c. 1800 d. Data inadequate

B. 1150

C. 1800

D. None of these

Answer: C

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2. If  $X = \{1, 2, 3, \dots, 10\}$  and 'a' represents any element of X, then the

set containing all the elements satisfy  $a+2=6, a\in X$  is

- A.  $\{4\}$
- $\mathsf{B}.\left\{3\right\}$
- $C. \{2\}$
- $\mathsf{D}.\left\{5\right\}$

## Answer: A

**3.** Let A, B, C be finite sets. Suppose that  $n(A)=11, n(B)=16, n(C)=21, n(A\cap B)=9$  and  $n(B\cap C)=10$ . Then the possible value of  $n(A\cup B\cup C)$  is

A. 27

B. 28

C. 29

D. Any of the three values 27, 28, 29 is possible

## Answer: D

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4. Which of the following in a null set :

A. {0}

B.  $\{x : x > 0 \text{ or } x < 0\}$ 

C. 
$$\{x : x^2 = 4 \text{ or } x = 3\}$$

D. 
$$ig\{x\!:\!x^2+1=0,x\in Rig\}$$

Answer: D



5. Let 
$$A=[x\!:\!x\in R,|x|<1];B=[x\!:\!x\in R,|x-1|\ge 1]$$
 and  $A\cup B=R-.$  , then the set D is A.  $\{x\!:\!1< x\le 2\}$ 

B.  $\{x : 1 \leq x < 2\}$ 

 $\mathsf{C}.\left\{x\!:\!1\leq x\leq 2\right\}$ 

D. None of these

Answer: B

**6.** Let  $F_1$  be the set of parallelograms,  $F_2$  the set of rectangle ,  $F_3$  the set of rhombuses,  $F_4$  the set of squares and  $F_5$  the set of trapeziums in a plane. Then,  $F_1$  may be equal to

A.  $F_2 \cap F_3$ B.  $F_3 \cap F_4$ C.  $F_2 \cup F_5$ 

D.  $F_2 \cup F_3 \cup F_4 \cup F_1$ 

## Answer: D

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7. Which is the simplified representation of  $(A' \cap B' \cap C) \cup (B \cap C) \cup (A \cap C)$  where A,B and C are subsets of set X ?

B. B

C. C

$$\mathsf{D}.\,X\cap (A\cup B\cup C)$$

#### Answer: C

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**8.** If  $A = \{a, \{b\}\}$ , then P(A) equals.

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

 $\mathsf{B}.\left\{\phi,\left\{a\right\}\right\}$ 

C.  $\{\{a\}, \{b\}, \phi\}$ 

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

#### Answer: A

9. If n(A) = 4 and n(B) = 7, then the difference between maximum and minimum value of  $n(A \cup B)$  is

A. 1 B. 2 C. 3 D. 11

#### Answer: D



**10.** At a certain conference of 100 people, there are 29 Indian women and 23 Indian men. Of these Indian people 4 are doctors and 24 are either men or doctors. There are no foreign doctors. How many foreigners and women doctors are attending the conference?

B. 34, 3

C. 46, 4

D. 42, 2

#### Answer: A

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**11.** In a certain town 25% families own a phone and 15% own a car 65%

own neither a phone nor a car. 2000 families own both a car and a phone.

Consider the following statements in this regard

(1) 10% families own both a car and a phone

- (2) 35% families own neither a car or a phone
- (3) 40,000 families live in the town

Which one of these statements are correct?

A. 1 and 2

B. 1 and 3

C. 2 and 3

D. 1,2 & 3

Answer: C

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12. The number of elements in the set

 $ig\{(a,b)\!:\!2a^2+3b^2=83,a,b\in Zig\}$  , where Z is the set of all integers, is

A. 2

B. 4

C. 8

D. 12

Answer: B

13. Let N be the set of non-negative integers, I the set of integers,  $N_p$  the set of non-positive integers, E the set of even integers and P the set of prime numbers. Then

A. 
$$I-N=N_p$$

- B.  $N \cap N_p = \phi$
- $\mathsf{C}.\, E\cap P=\phi$

D. 
$$N\Delta N_p = I - \{0\}$$

#### Answer: D

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14. In a survey of 400 students in a school, 100 were listed as taking apple juice, 150 as taking orange juice and 75 were listed as taking both apple as well as orange juice. Then, which of the following is/are true?I. 150 students were taking at least one juice.

II. 225 students were taking neither apple juice nor orange juice.

A. Only I is true

B. Only II is true

C. Both I and II are true

D. None of these

#### Answer: B

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15. Universal set  $U = \left\{x \mid x^5 - 6x^4 + 11x^3 - 6x^2 = 0
ight\}$  $A = \left\{x \mid x^2 - 5x + 6 = 0
ight\}$   $B = \left\{x \mid x^2 - 3x + 2 = 0
ight\}$  What is  $(A \cap B)$  'equal to?

A. 2

B. 3

C. 4

D. 5

## Answer: B

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**16.** In a school 80 students like chocolate, 40 like coffee if the number of students doesn't like any of them is equal to the number of students who like both of them then what is the total number of students in the school?

A. 115

B. 90

C. 120

D. None of these

Answer: C

17. 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  $a(' \cap B')$  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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18. One of the partitions of the set  $\left\{1,\,2,\,5,\,x,\,y,\,\sqrt{2},\,\sqrt{3}
ight\}$  is

A. 
$$\{\{1, 2, x\}, (x, 5, y\}, \{\sqrt{2}, \sqrt{3}\}\}$$
  
B.  $\{\{1, 2, \sqrt{2}\}, \{x, y, \sqrt{2}\}, \{5, \sqrt{2}, \sqrt{3}\}\}$   
C.  $\{\{1, 2\}, \{5, x\}, \{\sqrt{2}, \sqrt{3}\}\}$ 

D. 
$$\{\{1, 2, 5\}, \{x, y\}, \{\sqrt{2}, \sqrt{3}\}\}$$

Answer: D



**19.** Let A, B and C be finite sets such that  $A \cap B \cap C = \phi$  and each one of the sets  $A\Delta B, B\Delta C$  and  $C\Delta A$ has 200 elements. The number of elements is  $A \cup B \cup C$  is

A. 250

B. 200

C. 150

D. 300

## Answer: C

**20.** A town has total population of 25,000 out of which 13,000 read "The Times of India" and 10,500 read "The Hindustan Times". 2,500 read both papers. The percentage of population who read neither of these newspapers is

A. 16 B. 18 C. 20

D. 25

## Answer: A

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**21.** If

 $n(A)=1000, n(B)=500 \hspace{1mm} ext{and} \hspace{1mm} if \hspace{1mm} n(A\cap B)\geq 1 \hspace{1mm} ext{and} \hspace{1mm} n(A\cup B)=p$ 

, then

A.  $500 \leq p \leq 1000$ 

 $\texttt{B.}\,1001 \leq p \leq 1498$ 

 $\mathsf{C.1000} \leq p \leq 1498$ 

D.  $1000 \le p \le 1499$ 

#### Answer: D

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**22.** Let U = R. If  $A = \{x \in R : 0 < x < 2\}, B = \{x \in R : 1 < x \le 3\},$ 

Which of the following is false?

 $\mathsf{A}.\,A^{\,\prime}=\{x\in R\!:\!x\leq 0\,\text{ or }\,x\geq 2\}$ 

 $\mathsf{B}.\,B^{\,\prime}=\{x\in R\colon\! x\leq 1\,\text{ or }\,x>3\}$ 

 $\mathsf{C}.\, A\cup B=\{x\in R\!:\! 0\leq x\leq 3\}$ 

D. 
$$A \cup B = \{x \in R \colon 1 < x < 2\}$$

#### Answer: C

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**23.** If  $X = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ ,  $A = \{x \in N : 30 < x^2 < 70\}$ , B = {x x is a prime number less thean 10}, then which of the following is false?

A. 
$$A \cup B = \{2, 3, 5, 6, 7, 8\}$$
  
B.  $A \cap B = \{7, 8\}$ 

 $C.A - B = \{6, 8\}$ 

D. 
$$A\Delta B = \{2, 3, 5, 6, 8\}$$

#### Answer: B

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**24.** Which of the following is not correct? 1 ) $A\subseteq A^c$  if and only if  $A=\phi$ 

2)  $A^c \subseteq A$  if and only if A = X , where X is a universal set 3)If A UB = A UC ,

then B = C 4) A = B is equivalent to AUC = BUC and  $A \cap C = B \cap C$ 

A. 
$$A\subseteq A$$
' if and only if  $A=\phi$ 

B.  $A' \subseteq A$  if and only if A = X, where X is the universal set

C. if  $A \cup B = A \cup C$ , then B = C

D. B = C if and only if  $A \cup B = A \cup C$  and  $A \cap B = A \cap C$ 

#### Answer: C

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**25.** Let R be set of points inside a rectangle of sides a and b (a,b>1) with two sides along the positive direction of x-axis and y-axis

A. 
$$R=\{(x,y)\!:\!0\leq x\leq a,0\leq y\leq b\}$$

B. 
$$R = \{(x,y) \colon \! 0 \leq x < a, 0 \leq y \leq b\}$$

C. 
$$R = \{(x,y) : 0 \leq x \leq a, 0 < y < b\}$$

D. 
$$R = \{(x,y) \colon \! 0 < x < a, 0 < y < b\}$$

#### Answer: D

26. If  $X=\{8^n-7n-1\colon n\in N\}$  and  $Y=\{49(n-1)\colon n\in N\}$ , then A.  $X\subset Y$ B.  $Y\subset X$ C. X=YD.  $X\cap Y=\phi$ 

#### Answer: A

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27. Suppose  $A_1, A_2, \ldots, A_{30}$  are thirty sets each having 5 elements and  $B_1B_2, \ldots, B_n$  are n sets each having 3 elements ,Let  $\bigcup_{i=1}^{30} A_1 = \bigcup_{j=1}^n B_j = s$ 

and each element of S belongs to exactly 10 of the  $A_1$  and exactly 9 of the value of n.

## Answer: C

D. 35



**28.** The number of students who take both the subjects mathematics and chemistry is 30. This represents 10% of the enrolment in mathematics and 12% of the enrolment in chemistry. How many students take at least one of these two subjects?

A. 520

B. 490

C. 560

D. 480

## Answer: A



29. If set A and B are defined as

$$A = igg\{(x,y) \mid y = rac{1}{x}, 0 
eq x \in Rigg\}, B = \{(x,y) \mid y = -x, x \in R, \}.$$

Then

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

## Answer: C

**30.** If S = {x|x is a positie multiple of 3 les than 100} and P = {x | x is a prime number less than 20}. Then , n(S) + n(P) is equal to

A. 34

B. 31

C. 33

D. 41

## Answer: D