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**EXERCISE 1.1 - Question No. 1**

Which of the following are sets? Justify your answer. (i) The collection of all the months of a year beginning with the letter J. (ii) The collection of ten most talented writers of India. (iii) A team of eleven bestcricket batsmen of the world. (iv) The collection of all boys in your class. (v) The collection of all natural numbers less than 100. (vi) A collection of novels written by the writer Munshi Prem Chand. (vii) The collection of all even integers. (viii) The

collection of questions in this Chapter. (ix) A collection of most dangerous animals of the world.

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### EXERCISE 1.1 - Question No. 2

Let  $A = \{1, 2, 3, 4, 5, 6\}$ . Insert the appropriate symbol  $\in$  or  $\notin$  in the blank spaces: (i)  $5 \in A$  (ii)  $8 \notin A$  (iii)  $0 \notin A$  (iv)  $4 \in A$  (v)  $2 \in A$  (vi)  $10 \notin A$ .

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### EXERCISE 1.1 - Question No. 3

Write the following sets in roster form: (i)  $A = \{x : x \text{ is an integer and } 3 < x < 7\}$  (ii)  $B = \{x : x \text{ is a natural number less than } 6\}$  (iii)  $C = \{x : x \text{ is a twodigit natural number such that the sum of its digits is } i\}$  (iv)  $D = \{x : x \text{ is}$

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#### EXERCISE 1.1 - Question No. 4

Write the following sets in the setbuilder form: (i)  $\{3, 6, 9, 12\}$  (ii)  $\{2, 4, 8, 16, 32\}$  (iii)  $\{5, 25, 125, 625\}$  (iv)  $\{2, 4, 6, \dots\}$  (v)  $\{1, 4, 9, \dots, 100\}$

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**EXERCISE 1.1 - Question No. 5**

List all the elements of the following sets : (i)  $A = \{x : x \text{ is an odd natural number}\}$  (ii)  $B = \{x : x \text{ is an integer, } -\frac{1}{2} < x < 92\}$  (iii)  $C = \{x : x \text{ is an integer, } x^2 \leq 4\}$  (iv)  $D = \{x \text{ a letter in the word loyal}\}$  (v)  $E = \{x \text{ integer, } x < 9\}$

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**EXERCISE 1.1 - Question No. 6**

Match each of the set on the left in the roster form with the same set on the right described in setbuilder form: (i)  $\{1, 2, 3, 6\}$  (a)  $\{x :$

$x$  is a prime number and a divisor of 6} (ii)  $\{2, 3\}$  (b)  $\{x : x \text{ is an odd natural number less than } 10\}$

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### EXERCISE 1.2 - Question No. 1

Which of the following are examples of the null set (i) Set of odd natural numbers divisible by 2 (ii) Set of even prime numbers (iii)  $\{x : x \text{ is a natural number, } x < 5 \text{ and } x > 7\}$  (iv)  $\{y : y \text{ is a point common to any two parallel lines}\}$

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### EXERCISE 1.2 - Question No. 2

Which of the following sets are finite or infinite (i) The set of months of a year (ii)  $\{1, 2, 3, \dots\}$  (iii)  $\{1, 2, 3, \dots, 99, 100\}$  (iv) The set of positive integers greater than 100 (v) The set of prime numbers less than 99

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### EXERCISE 1.2 - Question No. 3

State whether each of the following set is finite or infinite: (i) The set of lines which are parallel to the x-axis (ii) The set of letters in the English alphabet (iii) The set of numbers which are multiple of 5 (iv) The set of animals living on the earth (v) The set of circles passing through the origin  $(0, 0)$

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**EXERCISE 1.2 - Question No. 4**

In the following, state whether  $A = B$  or not: (i)  $A = \{a, b, c, d\}$

$B = \{d, c, b, a\}$  (ii)  $A = \{4, 8, 12, 16\}$   $B = \{8, 4, 16, 18\}$  (iii)

$A = \{2, 4, 6, 8, 10\}$   $B = \{x: x \text{ is po}$

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**EXERCISE 1.2 - Question No. 5**

Are the following pair of sets equal? Give reasons. (i)  $A = \{2, 3\}$  ,

$B = \{x: x \text{ is solution of } x^2 + 5x + 6 = 0\}$  (ii)  $A = \{x : x \text{ is a letter$

in the word FOLLOW}  $B = \{y : y \text{ is a letter in the word WOLF}\}$

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**EXERCISE 1.2 - Question No. 6**

From the sets given below, select equal sets :  $A = \{2, 4, 8, 12\}$  ,

$B = \{1, 2, 3, 4\}$  ,  $C = \{4, 8, 12, 14\}$  ,  $D = \{3, 1, 4, 2\}$   $E = \{-1, 1\}$

,  $F = \{0, a\}$  ,  $G = \{1, -1\}$  ,  $H = \{0, 1\}$

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**EXERCISE 1.3 - Question No. 1**

Make correct statements by filling in the symbols  $\subset$  or  $\supset$  in the

blank spaces : (i)  $\{2, 3, 4\}$   $\{1, 2, 3, 4, 5\}$  (ii)  $\{a, b, c\}$   $\{b, c, d\}$  (iii)  $\{x : x$



is a student of Class XI of your school}

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### EXERCISE 1.3 - Question No. 2

Examine whether the following statements are true or false: (i)

$\{a, b\} \subset \{b, c, a\}$  (ii)  $\{a, e\} \subset \{x : x \text{ is a vowel in the English}$

alphabet} (iii)  $\{1, 2, 3\} \subset \{1, 3, 5\}$  (iv)  $\{a\} \subset \{a, b, c$

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### EXERCISE 1.3 - Question No. 3

Let  $A = \{1, 2, \{3, 4\}, 5\}$ . Which of the following statements are

incorrect and why? (i)  $\{3, 4\} \subset A$  (ii)  $\{3, 4\} \in A$  (iii)  $\{\{3, 4\}\} \subset A$

(iv)  $1 \in A$  (v)  $1 \subset A$  (vi)  $\{1, 2, 5\} \subset A$  (vii)  $\{1,$

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#### EXERCISE 1.3 - Question No. 4

Write down all the subsets of the following sets (i)  $\{a\}$  (ii)  $\{a, b\}$

(iii)  $\{1, 2, 3\}$  (iv)  $\varnothing$

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#### EXERCISE 1.3 - Question No. 5

How many elements has  $P(A)$ , if  $A = \varnothing$  ?

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### EXERCISE 1.3 - Question No. 6

Write the following as intervals : (i)  $\{x : x \in R, 4 < x \leq 6\}$  (ii)

$\{x : x \in R, 12 < x < 10\}$  (iii)  $\{x : x \in R, 0 \leq x < 7\}$  (iv)

$\{x : x \in R, 3 \leq x \leq 4\}$

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### EXERCISE 1.3 - Question No. 7

Write the following intervals in setbuilder form: (i)  $(3, 0)$  (ii)  $[6, 12]$

(iii)  $(6, 12]$  (iv)  $[23, 5)$

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### EXERCISE 1.3 - Question No. 8

What universal set(s) would you propose for each of the following :

(i) The set of right triangles. (ii) The set of isosceles triangles.

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### EXERCISE 1.3 - Question No. 9

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)  $\mathbb{R}$

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### EXERCISE 1.4 - Question No. 1

Find the union of each of the following pairs of sets : (i)

$X = \{1, 3, 5\}$   $Y = \{1, 2, 3\}$  (ii)  $A = \{a, e, i, o, u\}$   $B = \{a, b, c\}$  (iii)  $A$

$= \{x : x \text{ is a natural number and multiple of } 3\}$   $B = \{x : x \text{ is a na}$

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#### EXERCISE 1.4 - Question No. 2

Let  $A = \{a, b\}$  ,  $B = \{a, b, c\}$  .Is  $A \subset B$  ? What is  $A \cup B$  ?

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#### EXERCISE 1.4 - Question No. 3

taking the set of natural numbers as the universal set , write down the complement of the following sets :

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#### EXERCISE 1.4 - Question No. 4

If  $A = \{1, 2, 3, 4\}$  ,  $B = \{3, 4, 5, 6\}$  ,  $C = \{5, 6, 7, 8\}$  and

$D = \{7, 8, 9, 10\}$  : find (i)  $A \cup B$  (ii)  $A \cup C$  (iii)  $B \cup C$  (iv)  $B \cup D$

(v)  $A \cup B \cup C$  (vi)  $A \cup B \cup D$  (vii)  $B \cup C \cup D$

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#### EXERCISE 1.4 - Question No. 5

Find the intersection of each pair of sets of question 1 above.

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#### EXERCISE 1.4 - Question No. 6

If  $A = \{3, 5, 7, 9, 11\}$ ,  $B = \{7, 9, 11, 13\}$ ,  $C = \{11, 13, 15\}$  and  $D = \{15, 17\}$ ; find (i)  $A \cap B$  (ii)  $B \cap C$  (iii)  $A \cap C \cap D$  (iv)  $A \cap C$  (v)  $B \cap D$  (vi)  $A \cap (B \cup C)$  (vii)  $A \cap D$  (v

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#### EXERCISE 1.4 - Question No. 7

If  $A = \{x : x \text{ is a natural number}\}$ ,  $B = \{x : x \text{ is an even natural number}\}$ ,  $C = \{x : x \text{ is an odd natural number}\}$  and  $D = \{x : x \text{ is a prime number}\}$ , find (i)  $A \cap B$  (ii)  $A \cap C$  (iii)  $A \cap D$  (iv)  $B \cap C$  (v)  $B \cap D$  (vi)  $C \cap D$

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#### EXERCISE 1.4 - Question No. 8

Which of the following pairs of sets are disjoint (i)  $\{1, 2, 3, 4\}$  and  $\{x : x \text{ is a natural number and } 4 \leq x \leq 6\}$  (ii)  $\{a, e, i, o, u\}$  and  $\{c, d, e, f\}$  (iii)  $\{x : x \text{ is an even integer}\}$  and  $\{x : x \text{ is an odd integer}\}$

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**EXERCISE 1.4 - Question No. 9**

If  $A = \{3, 6, 9, 12, 15, 18, 21\}$  ,  $B = \{4, 8, 12, 16, 20\}$  ,

$C = \{2, 4, 6, 8, 10, 12, 14, 16\}$  ,  $D = \{5, 10, 15, 20\}$  ; find (i)  $A - B$

(ii)  $A - C$  (iii)  $A - D$

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**EXERCISE 1.4 - Question No. 10**

If  $X = \{a, b, c, d\}$  and  $Y = \{f, b, d, g\}$  , find (i)  $X - Y$  (ii)  $Y - X$  (iii)

$X \cap Y$

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**EXERCISE 1.4 - Question No. 11**

If  $\mathbb{R}$  is the set of real numbers and  $\mathbb{Q}$  is the set of rational numbers, then what is  $\mathbb{R} \setminus \mathbb{Q}$  ?

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#### EXERCISE 1.4 - Question No. 12

State whether each of the following statement is true or false.

Justify your answer. (i)  $\{2, 3, 4, 5\}$  and  $\{3, 6\}$  are disjoint sets, (ii)

$\{a, e, i, o, u\}$  and  $\{a, b, c, d\}$  are disjoint sets, (iii)

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#### EXERCISE 1.5 - Question No. 1

Let  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ ,  $A = \{1, 2, 3, 4\}$ ,  $B = \{2, 4, 6, 8\}$  and  $C = \{3, 4, 5, 6\}$ . Find (i)  $A'$  (ii)  $B'$  (iii)  $(A \cup C)'$  (iv)  $(A \cup B)'$  (v)  $(A \cap B)'$

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### EXERCISE 1.5 - Question No. 2

If  $U = \{a, b, c, d, e, f, g, h\}$ , find the complements of the following sets : (i)  $A = \{a, b, c\}$  (ii)  $B = \{d, e, f, g\}$  (iii)  $C = \{a, c, e, g\}$  (iv)  $D = \{f, g, h, a\}$

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### EXERCISE 1.5 - Question No. 3

Taking the set of natural numbers as the universal set, write down the complements of the following sets: (i)  $\{x : x \text{ is an even natural number}\}$  (ii)  $\{x : x \text{ is an odd natural number}\}$  (iii)  $\{x : x \text{ is a positive multiple of 3}\}$  (iv)  $\{x : x \text{ is a prime number}\}$

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#### EXERCISE 1.5 - Question No. 4

If  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ ,  $A = \{2, 4, 6, 8\}$  and  $B = \{2, 3, 5, 7\}$

. Verify that (i)  $(A \cup B)' = A' \cap B'$  (ii)  $(A \cap B)' = A' \cup B'$

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#### EXERCISE 1.5 - Question No. 5

Draw appropriate Venn diagram for each of the following : (i)

$(A \cup B)'$  (ii)  $A' \cap B'$  (iii)  $(A \cap B)'$  (iv)  $A' \cup B'$

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### EXERCISE 1.5 - Question No. 6

Let  $U$  be the set of all triangles in a plane. If  $A$  is the set of all triangles with at least one angle different from  $60^\circ$ , what is  $A'$  ?

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### EXERCISE 1.5 - Question No. 7

Fill in the blanks to make each of the following a true statement :

(i)  $A \cup A' = \dots$  (ii)  $\phi' \cap A = \dots$  (iii)  $A \cap A' = \dots$  (iv)  $U' \cap A = \dots$

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### EXERCISE 1.6 - Question No. 1

If  $X$  and  $Y$  are two sets such that  $n(X) = 17$ ,  $n(Y) = 23$  and

$n(X \cup Y) = 38$ , find  $n(X \cap Y)$ .

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### EXERCISE 1.6 - Question No. 2

If  $X$  and  $Y$  are two sets such that  $X$  has 18 elements,  $X$  has 8 elements and  $Y$  has 15 elements; how many elements does  $X \cap Y$  have?

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### EXERCISE 1.6 - Question No. 3

In a group of 400 people, 250 can speak Hindi and 200 can speak English. How many people can speak both Hindi and English?

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### EXERCISE 1.6 - Question No. 4

If  $S$  and  $T$  are two sets such that  $S$  has 21 elements,  $T$  has 32 elements, and  $S \cap T$  has 11 elements, how many elements does  $S \cup T$  have?

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#### EXERCISE 1.6 - Question No. 5

If  $X$  and  $Y$  are two sets such that  $X$  has 40 elements,  $X \cup Y$  has 60 elements and  $X \cap Y$  has 10 elements, how many elements does  $Y$  have?

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#### EXERCISE 1.6 - Question No. 6



In a group of 70 people, 37 like coffee, 52 like tea and each person likes at least one of the two drinks. How many people like both coffee and tea?

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#### EXERCISE 1.6 - Question No. 7

In a group of 65 people, 40 like cricket, 10 like both cricket and tennis. How many like tennis only and not cricket? How many like tennis?

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#### EXERCISE 1.6 - Question No. 8

In a committee, 50 people speak French, 20 speak Spanish and 10 speak both Spanish and French. How many speak at least one of these two languages?

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#### MISCELLANEOUS EXERCISE - Question No. 1

Decide, among the following sets, which sets are subsets of one and another:  $A = \{x : x \in \mathbb{R} \text{ and } x^2 - 8x + 12 = 0\}$ ,  $B = \{2, 4, 6\}$ ,  $C = \{2, 4, 6, 8, \dots\}$

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#### MISCELLANEOUS EXERCISE - Question No. 2

In each of the following, determine whether the statement is true or false. If it is true, prove it. If it is false, give an example. (i)

*If  $x \in A$  and  $A \in B$ , then  $x \in B$*  (ii) *If  $A \subset B$  and  $B \in C$  then  $A \in C$*

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### MISCELLANEOUS EXERCISE - Question No. 3

Let  $A$ ,  $B$  and  $C$  be the sets such that  $A \cup B = A \cup C$  and

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

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### MISCELLANEOUS EXERCISE - Question No. 4

Show that the following four conditions are equivalent: (i)  $A \subset B$

(ii)  $AB = \varphi$  (iii)  $A \cup B = B$  (iv)  $A \cap B = A$

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#### MISCELLANEOUS EXERCISE - Question No. 5

Show that if  $A \subset B$ , then  $C - B \subset C - A$ .

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#### MISCELLANEOUS EXERCISE - Question No. 6

Assume that  $P(A) = P(B)$ . Show that  $A = B$

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**MISCELLANEOUS EXERCISE - Question No. 7**

Is it true that for any sets  $A$  and  $B$ ,  $P(A) \cup P(B) = P(A \cup B)$  ?

Justify your answer.

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**MISCELLANEOUS EXERCISE - Question No. 8**

Show that for any sets  $A$  and  $B$ ,  $A = (A \cap B) \cup (AB)$  and  
 $A \cup (BA) = (A \cup B)$

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**MISCELLANEOUS EXERCISE - Question No. 9**

Using properties of sets, show that (i)  $A \cup (A \cap B) = A$  (ii)

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

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#### MISCELLANEOUS EXERCISE - Question No. 10

Show that  $A \cap B = A \cap C$  need not imply  $B = C$  .

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#### MISCELLANEOUS EXERCISE - Question No. 11

Let  $A$  and  $B$  be sets. If  $A \cap X = B \cap X = \varphi$  and  $A \cup X = B \cup X$  for some set  $X$ , show that  $A = B$  . (Hints

$A = A \cap (A \cup X)$ ,  $B = B \cap (B \cup X)$  and use Distributive law)

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### MISCELLANEOUS EXERCISE - Question No. 12

Find sets  $A$ ,  $B$  and  $C$  such that  $A \cap B$ ,  $B \cap C$  and  $A \cap C$  are non empty sets and  $A \cap B \cap C = \phi$ .

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### MISCELLANEOUS EXERCISE - Question No. 13

In a survey of 600 students in a school, 150 students were found to be taking tea and 225 taking coffee, 100 were taking both tea and coffee. Find how many students were taking neither tea nor coffee?

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**MISCELLANEOUS EXERCISE - Question No. 14**

In a group of students, 100 students know Hindi, 50 know English and 25 know both. Each of the students knows either Hindi or English. How many students are there in the group?

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**MISCELLANEOUS EXERCISE - Question No. 15**

In a survey of 60 people, it was found that 25 people read newspaper H. 26 read newspaper T, 26 read newspaper I, 9 read both H and I. 11 read both H and T, 8 read both T and I, 3 read all



three newspapers. Find: (i) the number of people who read at least one of the newspapers. (ii) the number of people who read exactly one newspaper.

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#### MISCELLANEOUS EXERCISE - Question No. 16

In a survey it was found that 21 people liked product A, 26 liked product B and 29 liked product C. If 14 people liked products A and B, 12 people liked products C and A, 14 people liked products B and C and 8 liked all the three products. Find how many liked product C only.

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### SOLVED EXAMPLES - Question No. 1

Write the solution set of the equation  $x^2 + x^2 = 0$  in roster form.

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### SOLVED EXAMPLES - Question No. 2

Write the set  $\{x : x \text{ is a positive integer } \geq 1 \text{ and } x^2 < 40\}$  in the roster form.

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### SOLVED EXAMPLES - Question No. 3

Write the set  $A = \{1, 4, 9, 16, 25, \dots\}$  in setbuilder form.

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**SOLVED EXAMPLES - Question No. 4**

Write the set  $\left\{ \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7} \right\}$  in the setbuilder form.

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**SOLVED EXAMPLES - Question No. 5**

Match each of the set on the left described in the roster form with the same set on the right described in the setbuilder form : (i)

$\{P, R, I, N, C, A, L\}$  (a)  $\{x : x \text{ is a positive integer and is a divisor of } 18\}$  (ii)  $\{0\}$

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### SOLVED EXAMPLES - Question No. 6

State which of the following sets are finite or infinite : (i)

$$\{x : x \in \mathbb{N} \text{ and } (x-1)(x-2) = 0\} \quad \text{(ii)} \quad \left\{x : x \in \mathbb{N} \text{ and } x^2 = 4\right\} \quad \text{(iii)}$$

$$\{x : x \in \mathbb{N} \text{ and } 2x-1 = 0\} \quad \text{(iv)} \quad \{x : x$$

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### SOLVED EXAMPLES - Question No. 7

Find the pairs of equal sets, if any, give reasons:  $A = \{0\}$ ,

$$B = \{x : x > 15 \text{ and } x < 5\}, \quad C = \{x : x^5 = 0\}, \quad D = \left\{x : x^2 = 25\right\},$$

$$E = \{x : x \text{ is a natural positive}$$

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**SOLVED EXAMPLES - Question No. 8**

The Fig 2.6 shows a relation between the sets P and Q. Write this relation (i) in set-builder form, (ii) in roster form. What is its domain and range?

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**SOLVED EXAMPLES - Question No. 9**

Consider the sets  $\phi$ ,  $A = \{1, 3\}$ ,  $B = \{1, 5, 9\}$ ,  $C = \{1, 3, 5, 7, 9\}$

Insert the symbol  $\subset$  or  $\supset$  between each of the following pair of sets

(i)  $\phi \subset B$  (ii)  $A \subset B$

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### SOLVED EXAMPLES - Question No. 10

Let  $A = \{a, e, i, o, u\}$  and  $B = \{a, b, c, d\}$ . Is  $A$  a subset of  $B$ ? No. (Why?). Is  $B$  a subset of  $A$ ? No. (Why?)

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### SOLVED EXAMPLES - Question No. 11

Let  $A$ ,  $B$  and  $C$  be three sets. If  $A \in B$  and  $B \subset C$ . is it true that  $A \subset C$ ? If not give an example.

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**SOLVED EXAMPLES - Question No. 12**

Let  $A = \{2, 4, 6, 8\}$  and  $B = \{6, 8, 10, 12\}$ . Find  $A \cup B$ .

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**SOLVED EXAMPLES - Question No. 13**

Let  $A = \{a, e, i, o, u\}$  and  $B = \{a, i, u\}$ . Show that  $A \cup B = A$

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**SOLVED EXAMPLES - Question No. 14**

Let  $X = \{\text{Rani, Geeta, Akbar}\}$  be the set of students of Class XI who are in school hockey team. Let  $Y = \{\text{Geeta, David, Ashok}\}$  be

the set of students from Class XI who are in the school football team. Find  $X \cup Y$  and interpret the set

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### SOLVED EXAMPLES - Question No. 15

Consider the sets  $A$  and  $B$  of Example 12. Find  $A \cap B$ .

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### SOLVED EXAMPLES - Question No. 16

Consider the sets  $X$  and  $Y$  of Example 14. Find  $X \cap Y$

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**SOLVED EXAMPLES - Question No. 17**

let  $f(x) = \sqrt{x}$  and  $g(x) = x$  be function defined over the set of non negative real numbers . find  $(f+g)(x)$  ,  $(f-g)(x)$  ,  $(fg)(x)$  and  $(f/g)(x)$  .

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**SOLVED EXAMPLES - Question No. 18**

Let  $A = \{1, 2, 3, 4, 5, 6\}$  ,  $B = \{2, 4, 6, 8\}$  . Find  $A - B$  and  $B - A$  .

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**SOLVED EXAMPLES - Question No. 19**

Let  $V = \{a, e, i, o, u\}$  and  $B = \{a, i, k, u\}$  . Find  $V - B$  and  $B - V$

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### SOLVED EXAMPLES - Question No. 20

Let  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$  and  $A = \{1, 3, 5, 7, 9\}$  . Find  $A'$  .

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### SOLVED EXAMPLES - Question No. 21

Let  $u$  be universal set of all the students of Class XI of a coeducational school and  $A$  be the set of all girls in Class XI. Find

$A'$  .

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### SOLVED EXAMPLES - Question No. 22

Let  $U = \{1, 2, 3, 4, 5, 6\}$  ,  $A = \{2, 3\}$  and  $B = \{3, 4, 5\}$  Find  $A'$  ,  
 $B'$  ,  $A' \cap B'$  ,  $A \cup B$  and hence show that  $(A \cup B)' = A' \cap B'$  . .

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### SOLVED EXAMPLES - Question No. 23

If  $X$  and  $Y$  are two sets such that  $X \cup Y$  has 50 elements,  $X$  has

28 elements and  $Y$  has 32 elements, how many elements does  $X \cap$

$Y$  have?

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### **SOLVED EXAMPLES - Question No. 24**

In a school there are 20 teachers who teach mathematics or physics.

Of these, 12 teach mathematics and 4 teach both physics and mathematics. How many teach physics?

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### **SOLVED EXAMPLES - Question No. 25**

In a class of 35 students, 24 like to play cricket and 16 like to play football. Also, each student likes to play at least one of the two games. How many students like to play both cricket and football?

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**SOLVED EXAMPLES - Question No. 26**

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. Find how many students were taking neither apple juice nor orange juice.

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**SOLVED EXAMPLES - Question No. 27**

There are 200 individuals with a skin disorder, 120 had been exposed to the chemical  $C_1$  ? 50 to chemical  $C_2$  , and 30 to both the

chemicals  $C_1$  and  $C_2$ . Find the number of individuals exposed to

(i) Chemical  $C_1$  but not chemical  $C_2$

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**SOLVED EXAMPLES - Question No. 28**

Show that the set of letters needed to spell CATARACT and the set of letters needed to spell TRACT are equal.

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**SOLVED EXAMPLES - Question No. 29**

List all the subsets of the set  $\{1, 0, 1\}$ .

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**SOLVED EXAMPLES - Question No. 30**

Show that  $A \cap B = A \cap B$  implies  $A = B$

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**SOLVED EXAMPLES - Question No. 31**

For any sets  $A$  and  $B$ . show that  $P(A \cap B) = P(A) \cap P(B)$ .

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**SOLVED EXAMPLES - Question No. 32**

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?

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**SOLVED EXAMPLES - Question No. 33**

Out of 500 car owners investigated, 400 owned car A and 200 owned car B, 50 owned both A and B cars. Is this data correct?

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**SOLVED EXAMPLES - Question No. 34**

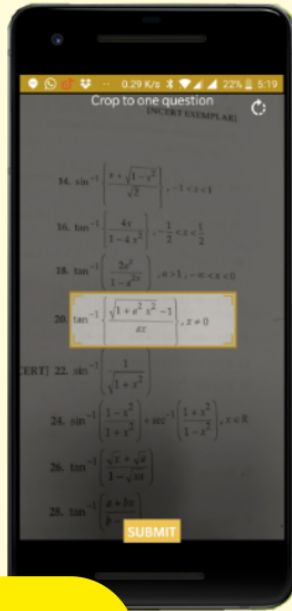


A college awarded 38 medals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 men and only three men got medals in all the three sports, how many received medals in exactly two of the three sports?

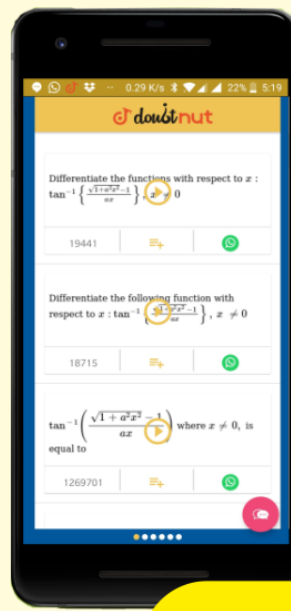
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