Overlapping Sets:- $A = \{1, 2, 3, 4, 5\}$ $B = \{2, 3, 7, 8, 9\}$

Common elements of A and B = $\{2, 3\}$
If two sets have at least one common element then they are said to be overlapping sets.

Ex-10(D)

i) $\{3, 5, 7, \ldots\}$
ans) Infinite

ii) $\{1, 2, 3, 4\}$
ans) Finite

iii) $\{\ldots, -3, -2, -1, 0, 1, 2\}$
ans) Infinite

iv) $\{20, 30, 40, 50, \ldots, 200\}$
ans) Finite

2) i) Set of counting numbers between 5 and 6. ☐
ans) Empty

ii) Set of odd numbers between 5 7 and 19. ☒
ans) This set is not empty.

iii) Set of odd numbers between 7 and 9. ☑
ans) Empty.

iv) Set of even numbers that are not divisible by 2. ☑
ans) Empty.

v) $\{0\}$
ans) This set in not empty.

3) i) {3, 5, 7} and {5, 3, 7}
ans) Both equal and equivalent

ii) {8, 6, 10, 12} and {3, 2, 4, 6}
ans) Equivalent

iii) {7, 7, 2, 1, 2} and {1, 2, 7}
ans) Equal

iv) {2, 4, 6, 8, 10} and {a, b, d, e, m}
ans) Equivalent

4) i) Set of integers.
ans) As, integers are infinite., this set is infinite.

ii) {Multiples of 5}
ans) As, the multiples of a no. are infinite, this set is infinite.

iii) {Fractions between 1 and 2}
ans) As, there are infinite number of fractions between 1 and 2, this set is infinite.

iv) {Number of people in India}
ans) As, a finite number of people live in India, this set is a finite set.

v) Set of trees in the world.
ans) As, there are infinite no. of trees in the world, this set is infinite set.

vi) Set of leaves on a tree.
ans) As, there are infinite no. of leaves in a tree. So, this set is infinite set

vii) Set of children in all the schools of Delhi.
ans) As, there are a finite no. of children studying in the schools of Delhi, this set is a finite set.

viii) $\{\ldots, -4, -2, 0, 2, 4, 6, 8\}$
ans) Infinite

ix) $\{-12, -9, -6, -3, 0, 3, 6, \ldots\}$
ans) Infinite

x) {Number of points in a line segment 4 cm long}.
ans) Infinite

5) i) {Prime numbers divisible by 2}
ans) Not empty

ii) {Negative natural numbers}
ans) Empty

iii) {Women with height 5 metre}
ans) Empty

iv) {Integers less than 5}
ans) Not empty

v) {Prime numbers between 17 and 23}
ans) Not empty

vi) Set of even numbers not divisible by 2.
ans) Empty

vii) Set of multiples of 3 that are more than 9 but less than 15. ans) Not empty

vii) Set of multiples of 3 that are more than 9 but less than 15. ans) Not empty.

6) i) {Natural numbers less than five} and {Letters of the word 'BOAT'}
ans) Equivalent

ii) {2, 4, 6, 8, 10} and {even natural numbers less than 12}.
ans) The given set of pair is equal. ∴ The set is equal.

iii) {1, 3, 5, 7, ...} and set of odd natural numbers.
ans) The given set of pair is equal ∴ The set is equal.

iv) {Letters of the word MEMBER} and {Letters of the word 'REMEMBER'}
ans) The letters of both the sets are same. ∴ The set is equal

v) {Negative natural numbers} and {30th day of a month}.
ans) We know, that there is no negative natural no. and month having 30 days. Thus both sets are empty. ∴ The set is equal. and equivalent also.

vi) {Even natural numbers} and {odd natural numbers}.
ans) The the same no. of elements in bothe the sets. ∴ This set is equivalent.

7) i) {2, 4, 6, 8, ..., 800}
ans) This set has a finite no. of elements. So, it is a finite set

ii) {..., -5, -4, -3, -2}
ans) This set has a infinite no. of elements. So, it is a infinite set.

iii) {x : x is an integere between -60 and 60}
ans) This set has a finite no. of elements. So, it is a finite set.

iv) {No. of electrical appliances working in your house}
ans) There are a finite no. of electrical appliances used at home. So, this set is finite.

v) {x : x is a whole no. greater than 20}
ans) The no. of whole no.s greater than 20 is infinite. So, this set is infinite

vi) {x : x is a whole no. less than 20}
ans) The no. of whole no.s less than 20 is finite. So, this set is finite.

8) i) False
ii) False
iii) True
iv) True
v) True
vi) True (Ex-6)
vii) True (no positive no. is smaller than 0)
viii) False

9) i) A girl cannot be both of age below 15 years and age above 15 years. So, it is a disjoint set.

ii) There are possibilities when the boys have age greater than 20 years and also above 27 years. So this is a set are overlapping.

iii) There are some common natural numbers that lie between both 35 and 60, and, 50 and 80. They are: from 51 to 59. Hence, the given set is over lapping.

iv) There are possibilities that students of class IX studying in C.B.S.E. board are common. Hence, the given sets are overlapping.

v) Since, 24 is the common natural number in both the given set. So, the given sets are overlapping.

vi) $P = \{a, l, h, b, d\}$
$Q = \{m, u, s, o, r, i, e\}$
Here, none of the elements of set P match with the elements of set Q. Hence, the set is disjoint.

Cardinality of a set

The number of elements in a set is called its cardinal number.

Ex:- $A = \{1, 3, 5, 7, 9\}$
Cardinal number of set $A = n(A) = 5$

$P = \{a, b, c, d\}$
$n(P) = 4$