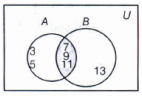
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Answers Key:

2 Marks

1. If A={2, 4, 6, 8}, B={6, 8, 10, 12} then A ∪∪ B {2, 4, 6, 8, 10, 12}
2. Given, A ={3, 5, 7, 9, 11},
   B ={7, 9, 11, 13}
   A ∩ B={7, 9, 11}
3. (i)→(b);(ii)→(c);(iii)→(d);(iv)→(a)
4. A ∪ B ={a, b, c, e, i, o, u}
5. Given 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}
   A′ = U-A={1,2,3,4,5,6,7,8,9}-{1,2,3,4},
   ={5,6,7,8,9}
6. Given 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}
   B′=U-B={{1,2,3,4,5,6,7,8,9}-{2,4,6,8}
   ={1,3,5,7,9}
7. Given 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}
   $A \cap C$={3,4}
   $\therefore (A \cap C)' = U - (A \cap C)$
   ={1,2,3,4,5,6,7,8,9}-{3,4} ={1,2,5,6,7,8,9}
8. Given, A = {1,2,3,4} B = {3,4,5,6}, C = {5,6,7,8} and D = {7,8,9,10}
   A ∪ B ∪ C = (A ∪ B) ∪ C
   = ({1,2,3,4} ∪{3,4,5,6}) ∪{5,6,7,8}
   = {1,2,3,4,5,6,} ∪ {5,6,7,8}
   = {1,2,3,4,5,6,7,8}
9. We have, A= {3,5,9,11} and B = {7,9,11,13}
   $\because A \cap B = \{3, 5, 7, 9, 11\} \cap \{7, 9, 11, 13\}$
   $\therefore A \cap B = \{7, 9, 11\}$



10. B∪D = {3, 4, 5, 6} ∪ {7, 8, 9, 10}
    = {3, 4, 5, 6, 7, 8, 9, 10}
11. A ∪ B ∪ D= {1,2, 3, 4}∪ {3, 4, 5, 6}∪{5,6, 7, 8}
    = {1, 2, 3,4, 5, 6} ∪ {5, 6, 7, 8}
    = {1, 2, 3, 4, 5, 6, 7, 8}
12. Here X = {a, b, c, d} and Y = {f, b, d, g}
    (i) X - Y = {a, b, c, d} - {f, b, d, g} = {a, c}
    (ii) Y - X = {f, b, d, g} - {a, b, c, d} = {f, g}
    (iii) X ∩ Y = {a, b, c, d} ∩ {f, b, d, g} = {b, d}
13. We have A ∪ B = { 2, 4, 6, 8, 10, 12} Note that the common elements 6 and 8 have been taken only once while writing A ∪ B
14. We have, A ∪ B = { a, e, i, o, u } = A. This example illustrates that union of sets A and its subset B is the set A itself, i.e., if B ⊂ A, then A ∪ B = A.
15. We have A ∩ B = { 2, 3, 5, 7 } = B. We note that B ∈ A and that A ∩ B = B.
16. We have, A – B = { 1, 3, 5 }, since the elements 1, 3, 5 belong to A but not to B and B – A = { 8 }, since the element 8 belongs to B and not to A. We note that A – B ≠ B – A.
17. We have, V – B = { e, o }, since the elements e, o belong to V but not to B and B – V = { k }, since the element k belongs to B but not to V. We note that V – B ≠ B – V. Using the setbuilder notation, we can rewrite the definition of difference as A – B = { x : x ∈ A and x ∉ B } The difference of two sets A and B can be represented by Venn diagram . The shaded portion represents the difference of the two sets A and B.
    Remark The sets A – B, A Ç B and B – A are mutually disjoint sets, i.e., the intersection of any of these two sets is the null

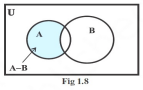


Fig 1.8

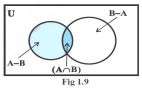


Fig 1.9

18. (i) X – Y
    X – Y = {a, c}
    (ii) Y – X
    Y – X = {f, g}
    (iii) X ∩ Y
    X ∩ Y = {*b, d*}

19. We note that 2, 4, 6, 8, 10 are the only elements of U which do not belong to A. Hence A' = { 2, 4, 6, 8,10 }.

20. Clearly A' = {1, 4, 5, 6}, B' = { 1, 2, 6 }. Hence $A' \cap B'$ = { 1, 6 }
Also $(A \cup B)$ = { 2, 3, 4, 5 }, so that $(A \cup B)'$ = { 1, 6 }
$(A \cup B)'$ = { 1, 6 } = $A' \cap B'$
It can be shown that the above result is true in general. If A and B are any two subsets of the universal set U, then
$(A \cup B)' = A' \cap B'$. Similarly, $(A \cap B)' = A' \cup B'$. These two results are stated in words as follows :
The complement of the union of two sets is the intersection of their complements and the complement of the intersection of two sets is the union of their complements. These are called De Morgan's laws. These are named after the
mathematician De Morgan. The complement A' of a set A can be represented by a Venn diagram . The shaded portion represents the complement of the set A.

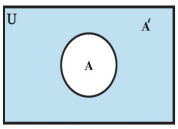


Fig 1.10

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