WORKED

OUT

*Examples*

***Example 1*** *If A* = {3, 5, 7, 9,11}*, B* = {7, 9,11,13}*,*

*C* = {11, 13, 15} *and D* = {15, 17}*, then* (*A* u *D*) n (*B* u *C*) *is equal to*

(*a*) {5, 7, 9, 11, 15} (*b*) {7, 9, 11, 15}

(*c*) {7, 9, 11, 13, 15} (*d*) *None of these*

**Solution** (*b*) Given, *A* = {3, 5, 7, 9,11}, *B* = {7, 9,11,13},

*C* = {11,13,15} and *D* = {15,17}

Now, *A* u*D* = {3, 5, 7, 9,11} u{15,17}

= {3, 5, 7, 9,11,15,17}

and *B* u *C* = {7, 9,11,13} u{11,13,15} = {7, 9,11,13,15}

m (*A* u*D*) n(*B* u*C*) = {3, 5, 7, 9,11,15,17} n {7, 9,11,13,15}

= {7, 9,11,15}

***Example 2*** *The set* (*A* u *B* u *C*) n (*A* n *B*’ n *C* ’ )’ n *C* ’ *is equal to*

*(a) B* n*C*’ *(b) A* n*C*

*(c) B*’n *C*’ *(d) None of these*

**Solution** (*a*) (*A* u*B* u*C*) n(*A* n*B*’ n*C*’)’ n*C*’

= (*A* u*B* u*C*) n(*A*’ u*B* u*C*) n*C*’

= (ф u*B* u*C*) n*C*’

= (*B* u*C*) n*C*’

= (*B* n*C*’) uф = *B* n*C*’

***Example 3*** *Let A*, *B* and *C are subsets of universal set U. If A* = {2, 4, 6, 8, 12, 20}*, B* = {3, 6, 9, 12, 15}*, C* = {5, 10, 15, 20}

# *and U is the set of all whole numbers. Then, the correct Venn*

*diagram is* **[NCERT]**

*A* 2 4

8 12 6

20 15

5 10

*C*

3 *B U*

9

*C* = {5,10 ,15, 20}

Now, *A* n*B* = {2, 4, 6, 8,12, 20} n{3, 6, 9,12 ,15} = {6,12}

*B* n *C* = {3, 6, 9,12,15} n{5,10 ,15, 20} = {15}

*C* n *A* = {5,10 ,15, 20} n{2, 4, 6, 8,12, 20} = {20}

and *A* n*B* n*C* = ф

*A* 2 4 6 3 *B*

*U*

8

12

20 15

5 10

9

*C*

# ***Example 4*** *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? **[NCERT]**

*(a)* 310 *(b)* 320 *(c)* 327 *(d)* 325

**Solution** (*d*) Let *C* and *T* denote the students taking coffee and tea, respectively.

Here, *n*(*T*) = 150, *n*(*C*) = 225,*n*(*C* n*T*) = 100

Using the identity *n*(*C* u*T*) = *n*(*T*) + *n*(*C*) – *n*(*C* n*T*), we have

*n*(*C* u*T*) = 150 + 225 – 100 = 375 – 100

→ *n*(*C* u*T*) = 275

Given, total number of students = 600 = *n*(*U*)

We are to find the number of students taking neither tea nor coffee *i.e*., *n*(*C* u*T*)’.

m *n*(*C* u*T*)’ = *n*(*U*) – *n*(*C* u*T*) = 600 – 275 = 325

# ***Example 5*** *If there are three atheletic teams in a school,*

(a)

(*c*)

*A* 2 4 6 3 *B*

*U*

8

12

20

15

5 10

*C*

9

(b)

# (*d*) *None of these*

*A* 2 4 6 3 *B*

*U*

8

12

20 15

5 10

*C*

9

21 *are in the basketball team,* 26 *in hockey team and* 29 *in the football team.* 15 *play hockey and basketball,* 15 *play hockey and football,* 12 *play football and basketball and* 8 *play all the games. The total number of members is*

1. 42 (*b*) 43

(*c*) 45 (*d*) *None of these*

**Solution** (*b*)m*n*(*B*) = 21,*n*(*H*) = 26,*n*(*F*) = 29,*n*(*H* n*B*) =14,

*n*(*H* n*F*) = 15, *n*(*F* n*B*) = 12, *n*(*B* n*H* n*F*) = 8

**Solution** (*b*) Given, *A* = {2, 4, 6, 8,12, 20}

*B* = {3, 6, 9,12,15}

m *n*(*B* u*H* u*F*) = *n*(*B*) + *n*(*H*) + *n*(*F*) – *n*(*B* n*H*)

– *n*(*H* n*F*) – *n*(*B* n*F*) + *n*(*B* n*H* n*F*)