



## SOLUTION

## 1. NTA Ans. (29.00)

Sol.  $n(A) = 25$   
 $n(B) = 7$   
 $n(A \cap B) = 3$   
 $n(A \cup B) = 25 + 7 - 3 = 29$

## 2. Official Ans. by NTA (1)

Sol.  $A : D \geq 0$   
 $\Rightarrow (m+1)^2 - 4(m+4) \geq 0$   
 $\Rightarrow m^2 + 2m + 1 - 4m - 16 \geq 0$   
 $\Rightarrow m^2 - 2m - 15 \geq 0$   
 $\Rightarrow (m-5)(m+3) \geq 0$   
 $\Rightarrow m \in (-\infty, -3] \cup [5, \infty)$   
 $\therefore A = (-\infty, -3] \cup [5, \infty)$   
 $B = [-3, 5)$   
 $A - B = (-\infty, -3) \cup [5, \infty)$   
 $A \cap B = \{-3\}$   
 $B - A = (-3, 5)$   
 $A \cup B = R$

## 3. Official Ans. by NTA (8)

Sol.  $\Delta = \begin{vmatrix} 1 & -2 & 5 \\ -2 & 4 & 1 \\ -7 & 14 & 9 \end{vmatrix} = 0$

Let  $x = k$

$\Rightarrow$  Put in (1) & (2)  
 $k - 2y + 5z = 0$   
 $-2k + 4y + z = 0$

$z = 0, y = \frac{k}{2}$

$\therefore x, y, z$  are integer  
 $\Rightarrow k$  is even integer

Now  $x = k, y = \frac{k}{2}, z = 0$  put in condition

$15 \leq k^2 + \left(\frac{k}{2}\right)^2 + 0 \leq 150$

$12 \leq k^2 \leq 120$

$\Rightarrow k = \pm 4, \pm 6, \pm 8, \pm 10$

$\Rightarrow$  Number of element in  $S = 8$ .

## 4. Official Ans. by NTA (4)

Sol.  $n(B) \leq n(A \cup B) \leq n(U)$   
 $\Rightarrow 76 \leq 76 + 63 - x \leq 100$   
 $\Rightarrow -63 \leq -x \leq -39$   
 $\Rightarrow 63 \geq x \geq 39$

## 5. Official Ans. by NTA (4)

Sol.  $n(X_i) = 10, \bigcup_{i=1}^{50} X_i = T, \Rightarrow n(T) = 500$

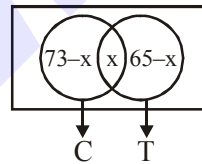
each element of  $T$  belongs to exactly 20

elements of  $X_i \Rightarrow \frac{500}{20} = 25$  distinct elements

so  $\frac{5n}{6} = 25 \Rightarrow n = 30$

## 6. Official Ans. by NTA (4)

Sol.  $C \rightarrow$  person like coffee  
 $T \rightarrow$  person like Tea  
 $n(C) = 73$



$n(T) = 65$

$n(C \cup T) \leq 100$

$n(C) + n(T) - n(C \cap T) \leq 100$

$73 + 65 - x \leq 100$

$x \geq 38$

$73 - x \geq 0 \Rightarrow x \leq 73$

$65 - x \geq 0 \Rightarrow x \leq 65$

$\boxed{38 \leq x \leq 65}$

## 7. Official Ans. by NTA (28.00)

Sol.  $2^m - 2^n = 112$

$m = 7, n = 4$

$(2^7 - 2^4 = 112)$

$m \times n = 7 \times 4 = 28$