



1. Let A and B be two sets containing four and two elements respectively. Then the number of subsets of the set  $A \times B$ , each having at least three elements is :

(1) 219

(2) 256

(3) 275

(4) 510

**Answer:** Given number of elements in A,  $n(A) = 4$

Number of elements in B,  $n(B) = 2$

Therefore total number of elements in  $A \times B = n(A \times B) = 8$

Therefore number of subsets each having at least 3 elements

$$= {}^8C_3 + {}^8C_4 + {}^8C_5 + {}^8C_6 + {}^8C_7 + {}^8C_8$$

We know that  $(1 + 1)^8 = {}^8C_0 + {}^8C_1 + {}^8C_2 + {}^8C_3 + \dots + {}^8C_8$

$$\text{or } 2^8 = 1 + \frac{8!}{(8-1)! \times 1!} + \frac{8!}{(8-2)! \times 2!} + {}^8C_3 + {}^8C_4 + {}^8C_5 + {}^8C_6 + {}^8C_7 + {}^8C_8$$

$$\text{or } 2^8 = 1 + 8 + 28 + {}^8C_3 + {}^8C_4 + {}^8C_5 + {}^8C_6 + {}^8C_7 + {}^8C_8$$

$$\text{or } 256 - 37 = {}^8C_3 + {}^8C_4 + {}^8C_5 + {}^8C_6 + {}^8C_7 + {}^8C_8$$

$$\text{or } {}^8C_3 + {}^8C_4 + {}^8C_5 + {}^8C_6 + {}^8C_7 + {}^8C_8 = 219$$

**Correct choice is (1) 219**