

PERMUTATIONS AND COMBINATIONS - Class XI

Past Year JEE Questions

Questions

Question: 01

How many different words can be formed by jumbling the letters in the word MISSISSIPPI in which no two S are adjacent?

- A. $8 \cdot {}^6C_4 \cdot {}^7C_4$
- B. $6 \cdot 7 \cdot {}^8C_4$
- C. $6 \cdot 8 \cdot {}^7C_4$
- D. $7 \cdot {}^6C_4 \cdot {}^8C_4$

Solutions

Solution: 01

Explanation

This problem is solved using gap method. As here no 'S' is adjacent to each other so we have to put them in the gap. So first write all the letters other than 'S' such a way that there is a gap between two letters.

Given word is MISSISSIPPI.

Here, I = 4 times, S = 4 times, P = 2 times, M = 1 time

_M_I_I_I_I_P_P_

Those seven letters M, I, I, I, I, P, P can be arranged in $\frac{7!}{4!2!}$ ways

Those seven letters creates 8 gaps and we have to choose 4 gaps from those 8 gaps to put those four 'S' letters.

This can be done 8C_4 ways.

After placing those four 'S' letters we can arrange them in $\frac{4!}{4!}$ ways.

Therefore, required number of words

$$= \frac{7!}{4!2!} \times {}^8C_4 \times \frac{4!}{4!}$$

$$= \frac{7 \cdot 6!}{4!4!} \times {}^8C_4$$

$$= 7 \cdot {}^6C_4 \cdot {}^8C_4$$