

## PERMUTATIONS AND COMBINATIONS - Class XI

### Related Questions with Solutions

#### Questions

##### Question: 01

In how many ways it is possible to select six letters, including at least one vowel from the letters of the word "F L A B E L L I F O R M ". (It is a picnic spot in U.S.A.)

#### Solutions

##### Solution: 01

F L [A] B [E] [I] [O] R M

F 2 times

L 3 times

→ one vowel →  ${}^4C_1$

[i] All different letters

$$FLBRM \rightarrow {}^5C_5 = 1$$

[ii] Two F,  $\underbrace{L, B, R, M}_{\text{Any 3}} \rightarrow {}^4C_3 = 4$

[iii] L,  $\underbrace{L, F, B, R, M}_{\text{Any 3}} \rightarrow {}^4C_3 = 4$

(iv) FF,  $\underbrace{L, B, R, M}_{\text{Any 1}} \rightarrow {}^3C_1 = 3$

[v] FFLLL → 1

(vi) LLL,  $\underbrace{F, B, R, M}_{\text{Any 2}} \rightarrow {}^4C_2 = 6$

$$\text{Total} = [1 + 4 + 4 + 3 + 6 + 1] {}^4C_1 = 76$$

Two vowels:---- ${}^4C_2$

[i] All different letters

$$\underbrace{FLBRM}_{\text{Any 4}} \rightarrow {}^5C_4 = 5$$

(ii) FF,  $\underbrace{L, B, R, M}_{\text{Any 2}} \rightarrow {}^4C_2 = 6$

(iii) LL,  $\underbrace{F, B, R, M}_{\text{Any 2}} \rightarrow {}^4C_2 = 6$

(iv) FFLL → 1

(v) LLL,  $\underbrace{F, B, R, M}_{\text{Any 1}} \rightarrow {}^4C_1 = 4$

$$\begin{aligned} \text{Total} [5 + 6 + 6 + 1 + 4] {}^4C_2 \\ = 22 \times 6 = 132 \end{aligned}$$

→ Three vowels →  ${}^4C_3$

[i] All different F, L, B, R, M →  ${}^5C_3 = 10$

[ii] LL,  $\underbrace{F, B, R, M}_{\text{Any 1}} \rightarrow {}^4C_1 = 4$

[iii] FF,  $\underbrace{L, B, R, M}_{\text{Any 1}} \rightarrow {}^4C_1 = 4$

[iv]  $\underbrace{F, B, R, M}_{\text{none}}, LLL \rightarrow 1$

$$\text{Total} = [10 + 4 + 4 + 1] {}^4C_3 = 76$$

→ Four vowels →  ${}^4C_4$

[i] All different ♦ F, L, B, R, M ⇒  ${}^5C_2 = 10$

[ii] FF ♦ 1

[iii] L,L ♦ 1

$$\text{Total} = {}^4C_4(10 + 1 + 1) = 12$$

Hence required number of ways to select six letters  
 $= 76 + 132 + 76 + 12 = 296$

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**Correct Options**

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Answer:01

Correct Answer: 296