

Conditions

There are 5 balls of different colors and 5 boxes of colors the same as those of the balls. The number of ways in which the balls, one in each box can be placed such that a ball does not go to a box of its own color is...?? WITH EXPLANATION PLEASE

Solution

Fix the 1st ball. It can be put in boxes in 4 different ways. The second ball can be put in boxes in 3 different ways, if 1st was put in the box with the same color as 2nd ball or in 4 different ways if it was put in that box. The same is to the 3rd ball – 2 different ways or 3 different ways. To 4th – 1 or 2. And for the last – 0 or 1. Hence, the maximum possible amount of ways is:

$$4 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 96$$

Answer: 96 ways