Combinatorics

Q.4 A bag contains 4 red, 5 blue, and 6 green balls. Two balls are drawn one after the other without replacement. What is the probability both are of different colors?

Soln. 1st Method

4R, 5B, 6G

$$P = \left(\frac{4}{15}\cdot\frac{5}{14} + \frac{4}{15}\cdot\frac{6}{14} + \frac{5}{15}\cdot\frac{4}{14} + \frac{5}{15}\cdot\frac{6}{14} + \frac{6}{15}\cdot\frac{4}{14} + \frac{6}{15}\cdot\frac{5}{14} \right)$$

$$= \frac{40 + 60 + 48}{15 \cdot 14} = \frac{148}{210} = \frac{74}{105}$$

2nd Method

Probability of selecting two balls of same color

$$P = \frac{4}{15}\cdot\frac{3}{14} + \frac{5}{15}\cdot\frac{4}{14} + \frac{6}{15}\cdot\frac{5}{14} = \frac{62}{210}$$