Problem:- Two balls are drawn at random in succession without replacement from an urn containing 4 red balls and 6 black balls. Find the probability of all possible outcomes

Solution:- Let us denote red ball as R and black ball as B

When two balls are drawn all possible outcomes are

RR, RB, BR, BB

Total number of balls = 4+6 = 10

Total number of possible ways 2 balls are drawn

$= {}^{10}P_2 = 10 \times 9 = 90$

$$\text{Probability (RR)} = \frac{\text{First draw as red balls possible ways} \times \text{Second draw as red balls possible ways}}{\text{Total number of possible way of picking 2 balls}}$$

$$= \frac{{}^4C_1 \times {}^3C_1}{90} = \frac{12}{90} = 0.1333$$

$$\text{Probability (RB)} = \frac{\text{Possible way of picking Red Ball first draw} \times \text{Possible way of picking black ball Second draw}}{\text{Total number of possible way of picking 2 balls}}$$

$$= \frac{{}^4C_1 \times {}^6C_1}{90} = \frac{24}{90} = 0.2667$$

$$\text{Probability (BR)} = \frac{\text{Possible way of picking black ball first draw} \times \text{Possible way of picking red ball second draw}}{\text{Total number of possible way of picking 2 balls}}$$

$$= \frac{{}^6C_1 \times {}^4C_1}{90} = \frac{24}{90} = 0.2667$$

$$\text{Probability (BB)} = \frac{\text{Possible way of picking black ball first draw} \times \text{Possible way of picking black ball second draw}}{\text{Total number possible way of picking 2 balls}}$$

$$= \frac{{}^6C_1 \times {}^5C_1}{90} = \frac{30}{90} = 0.3333$$

So, P(RR) = 0.1333 P(RB) = 0.2667 P(BB) = 0.2667 P(BB) = 0.3333