Assignment -3

Qu12 Bag 1 contains 4 white & 6 black balls
Bag 2 contains 4 white & 3 black balls
Ball is found to be Black. Find the probability that it was drawn from Bag 1

Ans E_1 be event of choosing Bag 1
E_2 be event of choosing Bag 2
A be event of drawing black ball.

$$P(E_1) = P(E_2) = \frac{1}{2}$$

Also, $P(A|E_1) = P(\text{drawing black ball from bag 1})$

$$= \frac{6}{10} = \frac{3}{5}$$

$$P(A|E_2) = P(\text{drawing black ball from bag 2})$$

$$= \frac{3}{7}$$

$$P(E_1|A) = \frac{P(E_1)\,P(A|E_1)}{P(E_2)\,P(A|E_2) + P(E_1)\,P(A|E_1)}$$

$$= \frac{\frac{1}{2} \times \frac{3}{5}}{\frac{1}{2} \times \frac{3}{7} + \frac{1}{2} \times \frac{3}{5}} = \frac{\frac{3}{10}}{\frac{3}{2}\left(\frac{1}{7} + \frac{1}{5}\right)}$$

$$= \frac{\cancel{3}}{\cancel{10}_2} \times \frac{\cancel{35}\,7}{\cancel{12}\,6} = \frac{7}{12}$$

Ans: $\boxed{P(E_1|A) = \frac{7}{12}}$

Assignment-3

Qus3 A man is known to speak truth 2 out of 3 times. He throws a die & reports that number obtained is a four. Find the probability that the no. obtained is four.

E is the event that man reports that number is four.
A is event that 4 occurs.
B is event that 4 ~~has~~ dosnot occur.

$$P(A) = \frac{1}{6} \qquad P(B) = \frac{5}{6}$$

$P(E|A)$ = Probability that man reports 4 occurs when four has actually occurred.
= Probability of truth = $\frac{2}{3}$

$$P(E|B) = 1 - \frac{2}{3} = \frac{1}{3}$$

$$P(A|E) = \frac{P(A) \times P(E|A)}{P(A) \times P(E|A) + P(B) \times P(E|B)}$$

$$= \frac{\frac{1}{6} \times \frac{2}{3}}{\frac{1}{6} \times \frac{2}{3} + \frac{5}{6} \times \frac{1}{3}}$$

$$= \frac{\frac{1}{9}}{\frac{7}{18}} = \frac{1}{9} \times \frac{18}{7}\,2 = \frac{2}{7}$$

Ans: $P(A|E) = \boxed{\frac{2}{7}}$