

Q2. Let  $E_1$  be the event of choosing bag 1 and  $E_2$  be the event of choosing bag 2.

$$P(E_1) = P(E_2) = 1/2$$

now

$$P(\text{drawing black ball from Bag 1}) = P(A|E_1) = \frac{6}{6+4} = \frac{6}{10} = \frac{3}{5}$$

$$\text{and } P(\text{drawing black ball from Bag 2}) = P(A|E_2) = \frac{3}{3+4} = \frac{3}{7}$$

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

$$= \frac{\frac{1}{2} \times \frac{3}{5}}{\frac{1}{2} \times \frac{3}{5} + \frac{1}{2} \times \frac{3}{7}}$$

$$\frac{\frac{1}{2} \times \frac{3}{5}}{\frac{1}{2} \times \frac{3}{5} + \frac{1}{2} \times \frac{3}{7}}$$

$$= \frac{\frac{3}{10}}{\frac{3}{10} + \frac{3}{14}}$$

$$\frac{\frac{3}{10}}{\frac{3}{10} + \frac{3}{14}}$$

$$= \frac{\frac{3}{10} \times \frac{7}{7}}{\frac{3}{10} \times \frac{7}{7} + \frac{3}{14} \times \frac{10}{10}} = \frac{\frac{21}{10}}{\frac{21}{10} + \frac{30}{14}} = \frac{21}{21 + 30} = \frac{21}{51} = \frac{7}{17}$$

$$= \frac{\frac{1}{2} \times \frac{3}{5}}{\frac{1}{2} \times \frac{3}{5} + \frac{1}{2} \times \frac{3}{7}}$$

$$\frac{\frac{1}{2} \times \frac{3}{5}}{\frac{1}{2} \times \frac{3}{5} + \frac{1}{2} \times \frac{3}{7}}$$

$$= \frac{\frac{3}{5} \times \frac{35}{35}}{\frac{3}{5} \times \frac{35}{35} + \frac{3}{7} \times \frac{35}{35}} = \frac{\frac{21}{5}}{\frac{21}{5} + \frac{30}{7}} = \frac{21}{21 + 30} = \frac{21}{51} = \frac{7}{17}$$

$$= \frac{2}{5} \times \frac{35}{35} = \frac{14}{17}$$

$$= \frac{7}{12}$$

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

Q3 Let  $E_1$  be the event that 4 occurs &  $P_1$  be the event the 4 does not occur

$$\therefore P(E_1) = 1/6$$

$$\text{and, } P(E_2) = \frac{5}{6}$$

$$P(\text{man tells it is 4 and 4 occurs}) = P(A/E_1) = 2/3$$

$$P(\text{man tells it was a 4 but 4 does not occur}) = P(A/E_2) = \frac{1}{3}$$

$$P(E_1/A) = \frac{P(E_1) \times P(A/E_1)}{P(E_1) \times P(A/E_1) + P(E_2) \times P(A/E_2)}$$

$$= \frac{\frac{1}{6} \times \frac{2}{3}}{\frac{1}{6} \times \frac{2}{3} + \frac{5}{6} \times \frac{1}{3}}$$
$$= \frac{2}{7}$$