

$$\text{الف) } P(R = \text{true}) = \sum_s P(s) \cdot P(R|s)$$

$$= P(s = \text{بدر}) \cdot P(R|s = \text{بدر}) + P(s = \text{پاییز}) \cdot P(R|s = \text{پاییز}) = \frac{1}{2} \times \frac{4}{10} + \frac{1}{2} \times \frac{1}{10} = \frac{5}{20}$$

$$\Rightarrow P(R = \text{true} | s = \text{پاییز}) = \frac{4}{10} \Rightarrow \text{بسیار محتمل}$$

$$\text{ج) } P(R = \text{true} | s = \text{پاییز}, H = \text{true}, D = \text{true}) = P(R | s = \text{پاییز}, H, D)$$

$$= \frac{P(R, s = \text{پاییز}, H, D)}{P(s = \text{پاییز}, H, D)} = \frac{P(s = \text{پاییز}) \cdot P(D|s) \cdot P(R|s) \cdot P(H|R, D)}{\sum_F P(s = \text{پاییز}) \cdot P(D|s) \cdot P(R|s) \cdot P(H|F, D)}$$

$$= \frac{P(s = \text{پاییز}) \cdot P(D|s) \cdot P(R|s) \cdot P(H|F, D)}{P(s = \text{پاییز}) \cdot P(D|s) \cdot P(R = \text{true} | s) \cdot P(H|R = \text{true}, D = \text{true}) + P(s = \text{پاییز}) \cdot P(D|s) \cdot P(R = \text{false} | s) \cdot P(H|R = \text{false}, D = \text{true})}$$

$$= \frac{P(s = \text{پاییز}) \cdot P(D|s) \cdot P(+R|s) \cdot P(+H|+F, +D)}{(P(s = \text{پاییز}) \cdot P(D|s)) (P(+R|s) \cdot P(+H|+F, +D) + P(-R|s) \cdot P(+H|-F, +D))}$$

$$= \frac{P(+R | s = \text{پاییز}) \cdot P(+H | +F, +D)}{P(+R | s = \text{پاییز}) \cdot P(+H | +F, +D) + P(-R | s = \text{پاییز}) \cdot P(+H | -F, +D)}$$

$$= \frac{\frac{4}{10} \times \frac{9}{10}}{\frac{4}{10} \times \frac{9}{10} + \frac{6}{10} \times \frac{8}{10}} = \frac{\frac{36}{100}}{\frac{84}{100}} = \frac{6}{14} = \frac{3}{7}$$

$$= \frac{\frac{4}{10} \times \frac{9}{10}}{\frac{4}{10} \times \frac{9}{10} + \frac{6}{10} \times \frac{8}{10}} = \frac{36}{84} = \frac{6}{14} = \frac{3}{7}$$

$$= \frac{\frac{4}{10} \times \frac{9}{10}}{\frac{4}{10} \times \frac{9}{10} + \frac{6}{10} \times \frac{8}{10}} = \frac{36}{84} = \frac{6}{14} = \frac{3}{7}$$