[nex42] Mixing marbles red and white

There are two white marbles in cup $A$ and four red marbles in cup $B$. In every step of a Markov process a marble is selected at random from each cup and placed into the opposite cup.

(a) What are the probabilities that after three steps cup $A$ contains (i) two white marbles, (ii) one white and one red marble, (iii) two red marbles?

(b) What is the limiting probability distribution of the three configurations after many steps?

Solution: