Please note that \( P(A \cup A_i) = P(A_i) + P(A) - P(A \cap A_i) \) from additive law of probability, i.e., Theorem 1.3.1 (iv) from page 7. From diagram above (also page 4 of the textbook) please note that \( A_i \Delta A \) \( = A_1 \triangle A_2 \) \( \cup (A_i \cap A) = A_1 \cup A_2 \). Thus, 
\[
P[A_1 \Delta A_2] + P(A \cap A_2) = P(A_1 \cup A_2)
\]
now use the above formula for \( P(A \cup A_i) \) to give 
\[
P[A_1 \Delta A_2] + P(A \cap A_2) = P(A_1) + P(A_2) - P(A \cap A_2),
\]
solving for the probability of the symmetric difference set gives the desired result.

The sample space consists of 52C4 distinct outcomes.

In (ii) we want ace, king, queen and jack all of clubs so there is only one outcome namely, \((A\clubsuit, K\clubsuit, Q\clubsuit, J\clubsuit)\). Hence the probability is \(1/52C4 = 1/270,725 = 0.000,003,6937852\).

In (iii) the event has four outcomes \((A\clubsuit, K\clubsuit, Q\clubsuit, J\clubsuit), (A\spadesuit, K\spadesuit, Q\spadesuit, J\spadesuit), (A\heartsuit, K\heartsuit, Q\heartsuit, J\heartsuit)\) and \((A\diамOND, K\diамOND, Q\diамOND, J\diамOND)\). Hence the answer is \(4/52C4 = 4/270,725 = 0.000,014,7751408\).

In (iv) the event is a simple event with only one outcome as in (ii) namely \((Q\clubsuit, Q\spadesuit, Q\heartsuit, Q\diамOND)\), hence the answer is the same as in (ii) namely, 0.000,003,6937852.