Q3. Hidden Markov Model

a. Count the number of parameters to define the initial distribution, the transition distribution, and the emission distribution.

Initial distribution: k-1
Transition distribution: k(k-1)
Emission distribution: k(m-1)

Total: Sum of all three = $k^2 + km\ - k - 1$

b. Does the number of parameters depend on the number of states? Briefly justify your answer
No it depends on the number of values the states can take.

c. $S_{t+1} \perp\ S_{t-1} \mid S_t$ (The future is independent of the past, given the present)