10.)

$$M = \begin{bmatrix} 0.7 & 0.2 & 0.2 & 0.1 \\ 0.1 & 0.6 & 0.1 & 0.1 \\ 0.1 & 0.2 & 0.6 & 0.1 \\ 0.1 & 0 & 0.1 & 0.7 \end{bmatrix} \qquad P_0 = \begin{bmatrix} 0.3 \\ 0.15 \\ 0.45 \\ 0.1 \end{bmatrix}$$

(a) Outcome of next election:

$$P_1 = MP_0 = \begin{bmatrix} 0.7 & 0.2 & 0.2 & 0.1 \\ 0.1 & 0.6 & 0.1 & 0.1 \\ 0.1 & 0.2 & 0.6 & 0.1 \\ 0.1 & 0 & 0.1 & 0.7 \end{bmatrix} \begin{bmatrix} 0.3 \\ 0.15 \\ 0.45 \\ 0.1 \end{bmatrix}$$

$$P_1 = \begin{bmatrix} 0.34 \\ 0.175 \\ 0.34 \\ 0.145 \end{bmatrix} \rightarrow \text{using matlab multiplication}$$

$$P_2 = MP_1 = M^2 P_0 = \begin{bmatrix} 0.3555 \\ 0.1875 \\ 0.2875 \\ 0.1695 \end{bmatrix} \rightarrow \text{using matlab multiplication}$$

↓

The election outcome after 2 years.

(b) Election after 100 years:

$$P_{100} = M^{100} P_0 = \begin{bmatrix} 0.36 \\ 0.20 \\ 0.24 \\ 0.20 \end{bmatrix} \rightarrow \text{reached election results after 100 years by matlab}$$

Percentage of citizens voting for party A = 0.36

Percentage of citizens voting for party C = 0.24