4. Equation (10) states:
(1.5pts)

$$\lim_{k\to\infty}\left\{\frac{1}{\lambda_1^k}x^{(k)}\right\} = P\begin{bmatrix} 1 & 0 & \cdots & 0 \\ 0 & & & \vdots \\ \vdots & & & \vdots \\ 0 & \cdots & \cdots & 0 \end{bmatrix} P^{-1}x^{(0)}$$

Evaluating the right side:

$$\begin{bmatrix} 1 & \cdots & 0 \\ 0 & & \vdots \\ \vdots & & \vdots \\ 0 & \cdots & 0 \end{bmatrix} P^{-1}x^{(0)} = \begin{bmatrix} c \\ 0 \\ \vdots \\ 0 \end{bmatrix}$$ where K is the first element of $P^{-1}x^{(0)}$.

$$P\begin{bmatrix} c \\ 0 \\ \vdots \\ 0 \end{bmatrix} = cP_1$$ where P_1 is the first column of P. But P is a matrix of eigenvectors $\Rightarrow P_1 = x_1$, the first eigenvector.

$\Rightarrow$ So, $$P\begin{bmatrix} 1 & 0 & \cdots & 0 \\ 0 & & & \vdots \\ \vdots & & & \\ 0 & \cdots & \cdots & 0 \end{bmatrix} P^{-1}x^{(0)} = cx_1.$$