Problem.

Let $X_n \overset{iid}{\sim} f$ where

$$f(x) = \frac{\lambda^k x^{k-1} \exp(-\lambda x)}{(k-1)!}$$

where $\lambda > 0$ is unknown and k is some known integer. What is the UMVUE for $\tau(\lambda) = \frac{1}{\lambda^2}$? Hint: $E[X_n] = k/\lambda$ and $Var(X_n) = k/\lambda^2$.

$\square$