Poisson : $P(y, \lambda) = \frac{\lambda^y \cdot e^{-\lambda}}{y!}$

$= \exp\left(\ln\left(\frac{\lambda^y e^{-\lambda}}{y!}\right)\right)$

$= \exp\left(\ln \lambda^y - \ln y! - \lambda\right)$

$= b(y) \exp\left[y^T T(y) - a(y)\right]$

with $b(y) = 1 \quad a(y) = \lambda \quad y = 1$

$T(y) = \ln \lambda^y - \ln y!$

T does not have this form in an exponential family. The y! should be pulled out front into b