Question #191
Key: B

$f(\lambda \mid 5,3) \propto \frac{e^{-\lambda}\lambda}{5!}\frac{e^{-\lambda}\lambda^3}{3!}\frac{2^5\lambda^5 e^{-2\lambda}}{24\lambda} \propto \lambda^{12}e^{-4\lambda}$. This is a gamma distribution with parameters 13 and 0.25. The expected value is 13(0.25) = 3.25.

Alternatively, if the Poisson-gamma relationships are known, begin with the prior parameters $\alpha = 5$ and $\beta = 2$ where $\beta = 1/\theta$ if the parameterization from *Loss Models* is considered. Then the posterior parameters are $\alpha' = 5+5+3 = 13$ where the second 5 and the 3 are the observations and $\beta' = 2+2 = 4$ where the second 2 is the number of observations. The posterior mean is then 13/4 = 3.25.