Question #156
Key: C

There are *n*/2 observations of *N* = 0 (given *N* = 0 or 1) and *n*/2 observations of *N* = 1 (given *N* = 0 or 1). The likelihood function is

$$L = \left(\frac{e^{-\lambda}}{e^{-\lambda} + \lambda e^{-\lambda}} \right)^{n/2} \left(\frac{\lambda e^{-\lambda}}{e^{-\lambda} + \lambda e^{-\lambda}} \right)^{n/2} = \frac{\lambda^{n/2} e^{-n\lambda}}{(e^{-\lambda} + \lambda e^{-\lambda})^n} = \frac{\lambda^{n/2}}{(1+\lambda)^n}.$$

Taking logs, differentiating and solving provides the answer.

$$l = \ln L = (n/2)\ln \lambda - n\ln(1+\lambda)$$

$$l' = \frac{n}{2\lambda} - \frac{n}{1+\lambda} = 0$$

$$n(1+\lambda) - n2\lambda = 0$$

$$1 - \lambda = 0, \quad \lambda = 1.$$