

### Question #116

Answer: D

Let  $M$  = the force of mortality of an individual drawn at random; and  $T$  = future lifetime of the individual.

$$\begin{aligned}\Pr[T \leq 1] &= E\{\Pr[T \leq 1|M]\} \\ &= \int_0^{\infty} \Pr[T \leq 1|M = \mu] f_M(\mu) d\mu \\ &= \int_0^2 \int_0^1 \mu e^{-\mu t} dt \frac{1}{2} d\mu \\ &= \int_0^2 (1 - e^{-\mu}) \frac{1}{2} d\mu = \frac{1}{2} (2 + e^{-2} - 1) = \frac{1}{2} (1 + e^{-2}) \\ &= 0.56767\end{aligned}$$