

46. Solution: D

The density function of T is

$$f(t) = \frac{1}{3}e^{-t/3}, \quad 0 < t < \infty$$

Therefore,

$$\begin{aligned} E[X] &= E[\max(T, 2)] \\ &= \int_0^2 \frac{2}{3}e^{-t/3} dt + \int_2^\infty \frac{t}{3}e^{-t/3} dt \\ &= -2e^{-t/3} \Big|_0^2 - te^{-t/3} \Big|_2^\infty + \int_2^\infty e^{-t/3} dt \\ &= -2e^{-2/3} + 2 + 2e^{-2/3} - 3e^{-t/3} \Big|_2^\infty \\ &= 2 + 3e^{-2/3} \end{aligned}$$