

122. A device contains two circuits. The second circuit is a backup for the first, so the second is used only when the first has failed. The device fails when and only when the second circuit fails.

Let  $X$  and  $Y$  be the times at which the first and second circuits fail, respectively.  $X$  and  $Y$  have joint probability density function

$$f(x, y) = \begin{cases} 6e^{-x}e^{-2y} & \text{for } 0 < x < y < \infty \\ 0 & \text{otherwise.} \end{cases}$$

What is the expected time at which the device fails?

- (A) 0.33
- (B) 0.50
- (C) 0.67
- (D) 0.83
- (E) 1.50