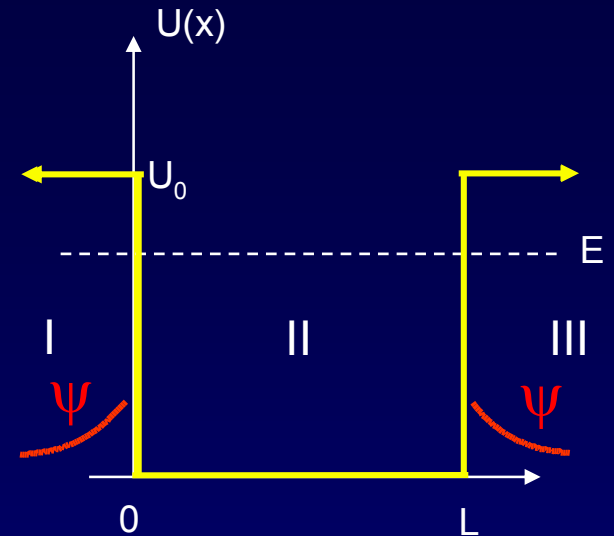# Solution

In region **III**, the wave function has the form

$$\psi_{III}(x) = D_1 e^{Kx} + D_2 e^{-Kx}$$

1. As $x \rightarrow \infty$, the wave function must vanish (why?). What does this imply for D_1 and D_2?

    a. $D_1 = 0$ b. $D_2 = 0$ c. D_1 and D_2 are both nonzero.

    Since $e^{Kx} \rightarrow \infty$ as $x \rightarrow \infty$, D_1 must be 0.

2. What can we say about the coefficients C_1 and C_2 for the wave function in region **I**?

    $$\psi_I(x) = C_1 e^{Kx} + C_2 e^{-Kx}$$

    a. $C_1 = 0$ b. $C_2 = 0$ c. C_1 and C_2 are both nonzero.

    Kx is *negative* for $x < 0$. $e^{-Kx} \rightarrow \infty$ as $x \rightarrow -\infty$. So, C_2 must be 0.