Given: \( A = \pi r^2, \quad \rho_2 = \rho_1, \quad A_2 = 2 A_1, \quad L_2 = 2 L_1, \) and \( V_2 = V_1. \)

Find the ratio \( \frac{I_2}{I_1} \) of the currents in the conductors.

A) \( \frac{I_2}{I_1} = 2. \)

B) \( \frac{I_2}{I_1} = 1. \)

C) \( \frac{I_2}{I_1} = \frac{1}{2}. \)
Using Ohm’s law, we have

\[
\frac{I_2}{I_1} = \frac{\left( \frac{V_2}{R_2} \right)}{\left( \frac{V_1}{R_1} \right)} = \frac{R_1}{R_2}
\]

\[
= \frac{\rho \left( \frac{L_2}{A_2} \right)}{\rho \left( \frac{L_1}{A_1} \right)} = \frac{\left( \frac{L_1}{L_2} \right)}{\left( \frac{A_1}{A_2} \right)} = 1.
\]

Answer B.

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