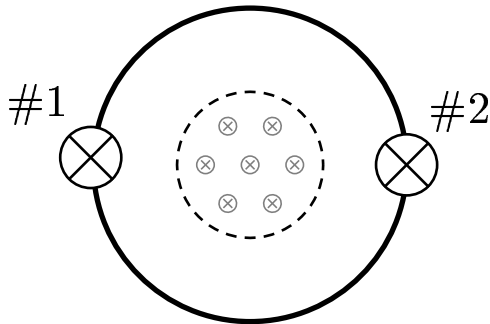


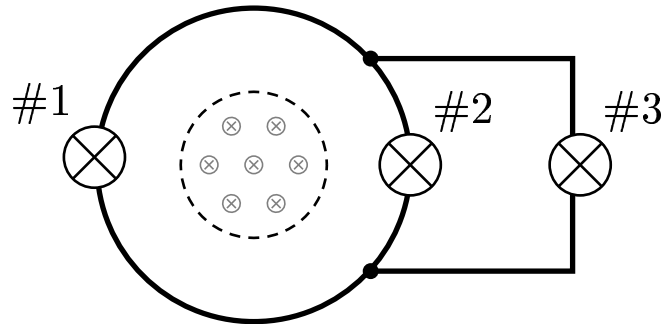
A solenoid is producing the same steadily increasing magnetic flux through two circular circuits shown below.

Case A: Two identical bulbs #1 and #2 are in series. Each has a resistance R . Their brightnesses (or their electric power) are the same, i.e. $P_1 = P_2$.

Case B: Bulbs #2 and #3 are in parallel, and the bulbs #2 and #3 are in series with the bulb #1. Each bulb has a resistance R . We label the respective electric powers of the bulbs by P'_1 , P'_2 and P'_3 .



Case A



Case B

Compare the power of bulbs #1 for two cases.

A) $P'_1 < P_1$

B) $P'_1 = P_1$

C) $P'_1 > P_1$

For case A, denote the current I . The loop equation is $\mathcal{E} - 2IR = 0$, or $I = \frac{\mathcal{E}}{2R}$. For case B, label currents through the bulbs by I'_1 , I'_2 and I'_3 respectively. By symmetry $I'_2 = I'_3$. Since $I'_1 = I'_2 + I'_3$, then $I'_1 = 2I'_2$. This leads to the loop equation: $\mathcal{E} - I'_1 R - I'_2 R = \mathcal{E} - \frac{3}{2} I'_1 R = 0$. Solving for I'_1 gives: $I'_1 = \frac{2}{3} \frac{\mathcal{E}}{R} = \frac{2}{3} (2I) = \frac{4}{3} I$. Here $I'_1 > I$, so $P'_1 > P_1$.

Answer **C**.