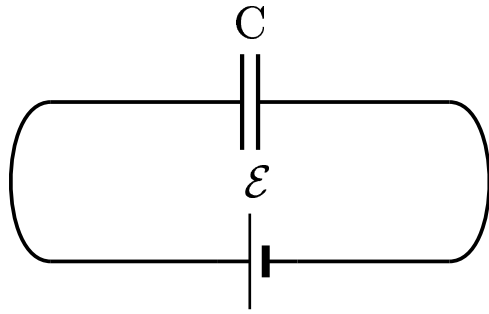


A Capacitor with capacitance  $C$  is connected to a battery with a voltage  $V$ . It has a plate charge  $Q$  and a total energy  $U$ . Fill the gap with material which has dielectric constant  $\kappa$ . The corresponding new quantities are  $Q'$  and  $U'$ .



Determine the ratio of charges  $\frac{Q'}{Q}$ .

- A)  $\frac{Q'}{Q} = \kappa$   
B)  $\frac{Q'}{Q} = 1$   
C)  $\frac{Q'}{Q} = \frac{1}{\kappa}$

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$$V' = \frac{Q'}{C'} = V = \frac{Q}{C}, \quad \text{or}$$
$$\frac{Q'}{Q} = \frac{C'}{C} = \kappa.$$

Answer **A**.