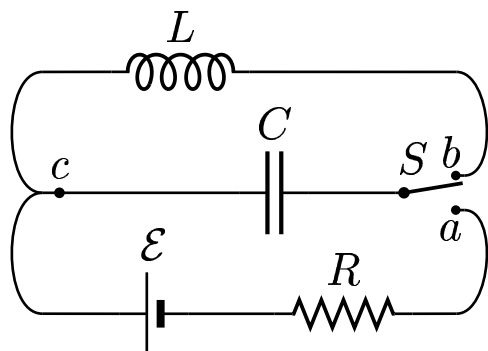


Given: A network containing a battery  $\mathcal{E}$ , and capacitor  $C$ , and resistor  $R$  and an inductor  $L$ .



Denote the angular frequency of the “LC” circuit by  $\omega = \frac{1}{\sqrt{LC}}$ .

The switch  $S$  is left at position  $a$  for a long period of time. The switch  $S$  is then moved from position  $a$  to  $b$  at  $t = 0$ .

Find the plate charge on the capacitor  $C$ .

- A)  $Q = \mathcal{E} C \sin \omega t$
- B)  $Q = \mathcal{E} C \cos \omega t$
- C)  $Q = \frac{\mathcal{E}}{C} \sin \omega t$
- D)  $Q = \frac{\mathcal{E}}{C} \cos \omega t$

Since the charge is maximum at  $t = 0$ ,  $Q = V C$ , and  $V = \mathcal{E}$ , we have

$$Q = \mathcal{E} C \cos \omega t.$$

Answer **B**.