361. 

## Problem 31.3 (RHK)

The capacitor shown in the figure has a capacitance of $26.0 \mu \mathrm{~F}$ and is initially uncharged. The battery supplies 125 V . We have to calculate the amount of charge that will have passed through the battery B, after switch $S$ has been closed for a long time.

## Solution:



It is given that a capacitor of capacitance $26.0 \mu \mathrm{~F}$ is initially uncharged. It is connected to a 125 V battery. After the switch has been closed and steady state has been achieved the amount of charge on the plates of the capacitor would be $q$, and $-q$. This implies that a charge of amount $q$ would have moved from the plate of the connected with the -ve terminal of the battery and through the battery to the plate connected with the +ve
terminal of the battery. From the definition of capacitance

$$
q=C V=26.0 \times 10^{-6} \times 125 \mathrm{C}=3.25 \times 10^{-3} \mathrm{C}=3.25 \mathrm{mF} .
$$



