361.

Problem 31.3 (RHK)

The capacitor shown in the figure has a capacitance of 26.0 μ 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 μ 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

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

