



## 1 DEFINITIONS

1. The unit step function is

$$u(t) = \begin{cases} 1 & t > 0 \\ \frac{1}{2} & t = 0 \\ 0 & t < 0 \end{cases} \quad (1.1)$$

2. The Laplace transform of  $g(t)$  is defined as

$$G(s) = \int_{-\infty}^{\infty} g(t)e^{-st} dt \quad (1.2)$$

3. In the circuit, the switch  $S$  is connected to position  $P$  for a long time so that the charge on the capacitor becomes  $q_1 \mu C$ . Then  $S$  is switched to position  $Q$ . After a long time, the charge on the capacitor is  $q_2 \mu C$ .

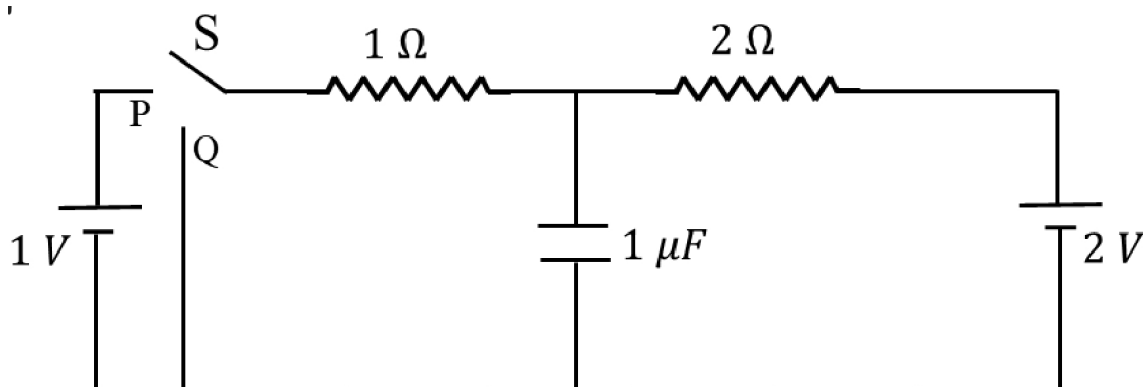


Fig. 1.1

## 2 PROBLEMS

- Find  $q_2$ .
- Draw the equivalent  $s$ -domain resistive circuit when  $S$  is switched to position  $Q$ . Use variables  $R_1, R_2, C_0$  for the passive elements.
- $V_{C_0}(s) = ?$

4.  $v_{C_0}(t) = ?$
5. Find  $v_{C_0}(0-)$ ,  $v_{C_0}(0+)$  and  $v_{C_0}(\infty)$ .