



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 $q_2 \mu C$.

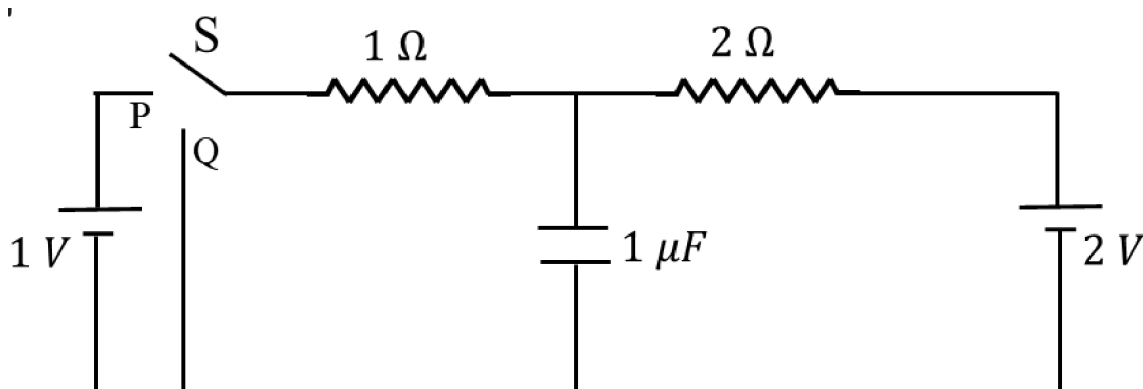


Fig. 1.1

2 PROBLEMS

1. Show that the Laplace transform of $u(t)$ is $\frac{1}{s}$ and find the ROC.
2. Find q_1 .
3. Find q_2 .