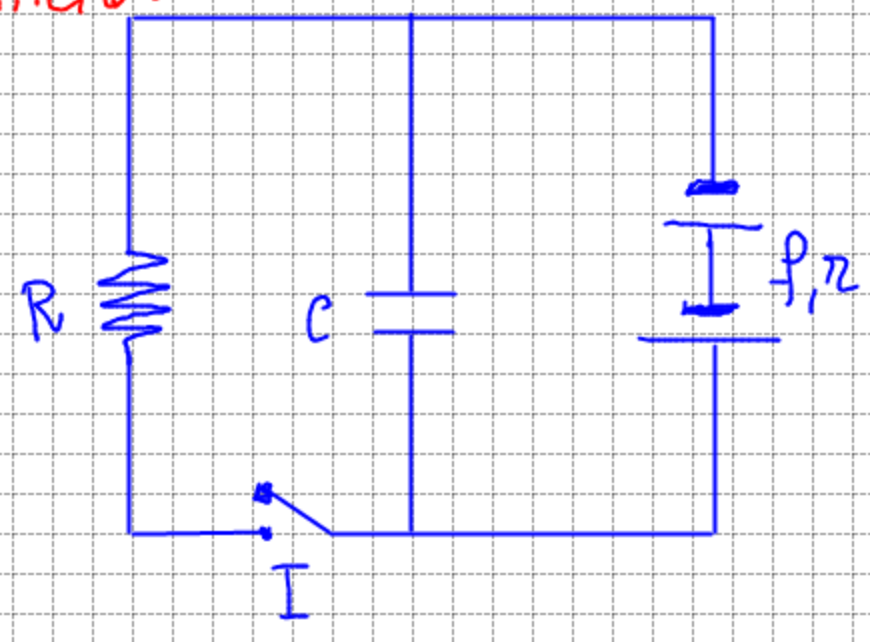
ES. N 98 PAG 672



a) $f - ri - Ri = 0 \qquad i = \frac{f}{r+R}$

$C = \frac{Q_0}{V} \qquad V = Ri \qquad i = \frac{Q_0}{CR} \Rightarrow \frac{f}{r+R} = \frac{Q_0}{CR} \qquad Q_0 = fC\frac{R}{r+R}$

b) $f - ri - \frac{q(t)}{C} = 0 \qquad f - r\,q'(t) - \frac{q(t)}{C} = 0$

c) $V(t) = \frac{q(t)}{C}$

$q'(t) + \frac{q(t)}{rC} = \frac{f}{r}$ moltiplico per $e^{\frac{1}{rC}t}$

$e^{\frac{1}{rC}t}\left(q'(t) + \frac{1}{rC}q(t)\right) = \frac{f}{r}e^{\frac{1}{rC}t}$

$e^{\frac{1}{rC}s}\,q(s)\Big|_0^t = fC\,e^{\frac{1}{rC}s}\Big|_0^t$

$e^{\frac{1}{rC}t}\,q(t) - 1\,q(0) = fC\,e^{\frac{1}{rC}t} - fC$

$q(t) = e^{-\frac{1}{rC}t}\left[\frac{fCR}{r+R} + fC\,e^{\frac{1}{rC}t} - fC\right]$

$q(t) = fC\left(1 - \frac{r}{r+R}e^{-\frac{1}{rC}t}\right)$

$V(t) = f\left(1 - \frac{r}{r+R}e^{-\frac{1}{rC}t}\right)$