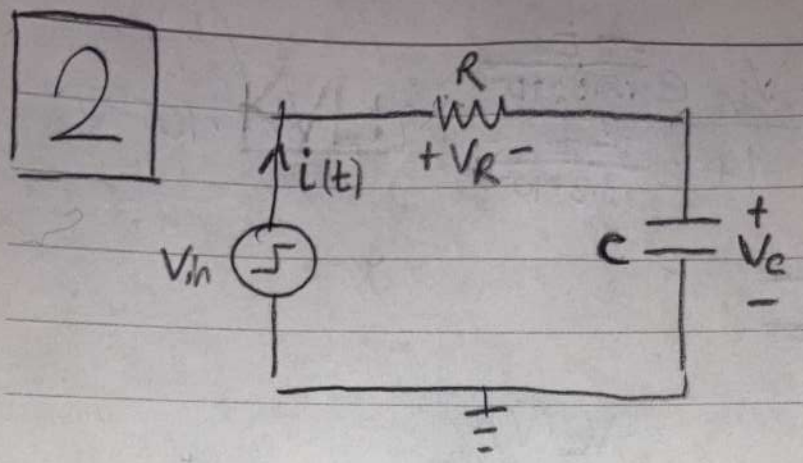
2



$$i(t) = \frac{V_{in} - V_c}{R} = C\frac{dV_c}{dt}$$

$$\Rightarrow C\frac{dV_c}{dt} + \frac{V_c}{R} = \frac{V_{in}}{R} \Rightarrow \frac{dV_c}{dt} + \frac{V_c}{RC} = \frac{V_{in}}{RC}$$

$0 \le t < T/2$: $V_{in} = 3$. $\frac{dV_c}{dt} + \frac{V_c}{RC} = \frac{3}{RC}$

$$\mu(t) = e^{\int \frac{1}{RC} dt} = e^{t/RC}$$

Multiply the eqn by $\mu(t)$:

$$(V_c \cdot e^{t/RC})' = \frac{3}{RC} e^{t/RC}$$

$$\Rightarrow V_c \cdot e^{t/RC} = 3e^{t/RC} + K$$

$$\Rightarrow V_c(t) = 3 + Ke^{-t/RC}$$

$$V_c(0) = 0 = 3 + K \Rightarrow K = -3.$$

$$V_c(t) = 3\left(1 - e^{-t/RC}\right)$$

$$V_R(t) = V_{in} - V_c = 3e^{-t/RC}$$