

EHB211E Basics of Electrical Circuits

HOMEWORK 3

For the PSpice solutions, provide the schematic showing the voltage and current values and the output file.

- 1) Calculate v_o in the op amp circuit of Figure 1 for given R_f values assuming all op amps are ideal. Also, obtain and show v_o using PSpice program.
 - a) $R_f=10\text{k}\Omega$ b) $R_f=\infty$ (Open Circuit)

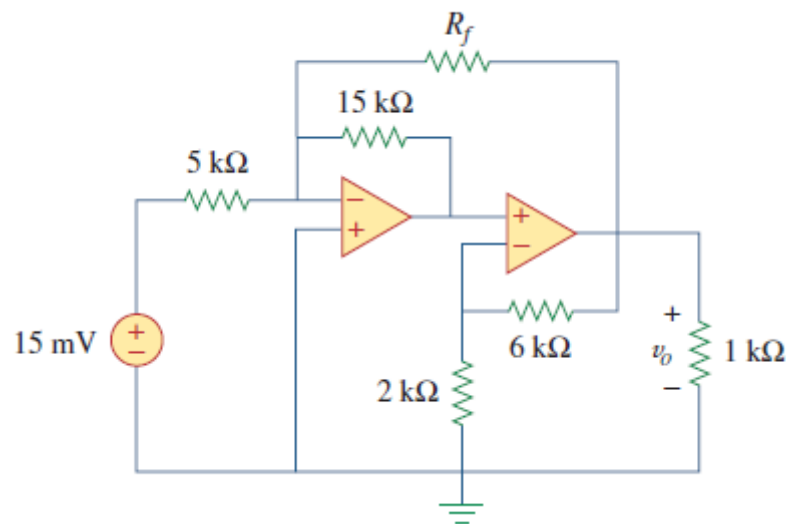


Figure 1

- 2) Design a single op amp circuit with $C = 2\mu\text{F}$ to generate the given function below by identifying other component values.

$$v_o = - \int_0^t (v_1 + 4v_2 + 10v_3) dt$$

3) For the op amp circuit in Figure 2, obtain the differential equations for $v_o(t)$.

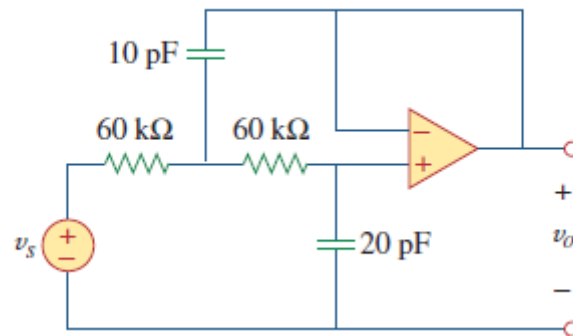


Figure 2

4) For the circuit in Figure 3 find $v_o(t)$ for $t > 0$, determine the time necessary for the capacitor voltage to decay to one-third of its value at $t = 0$.

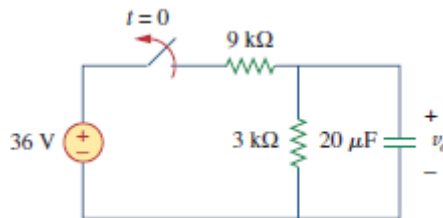


Figure 3

5) For the circuit in Figure 4, find:

- (a) $v(0^+)$ and $i(0^+)$,
- (b) $dv(0^+)/dt$ and $di(0^+)/dt$,
- (c) $v(\infty)$ and $i(\infty)$.

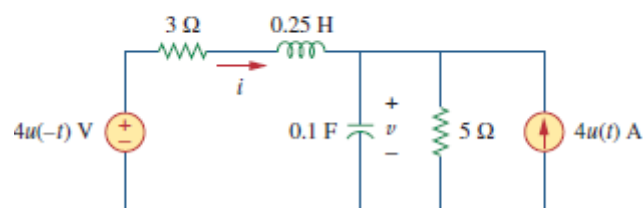


Figure 4