

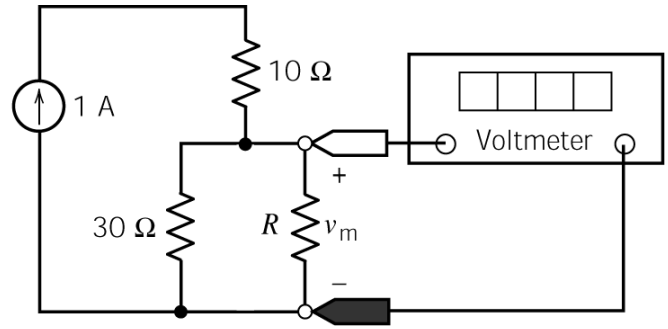
ES 250 First Midterm Bonus Practice Problems

1. The voltage measured by the voltmeter is

$$v_m = 20 \text{ V}$$

The value of the resistance R is 60 Ω .

The current source supplies 30 W of power.



2. Given that

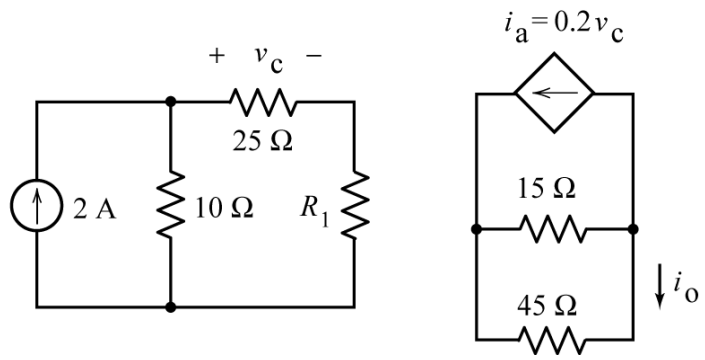
$$i_a = 2 \text{ A},$$

Determine the values of R_1 and v_o :

$$R_1 = \underline{15} \text{ } \Omega,$$

and

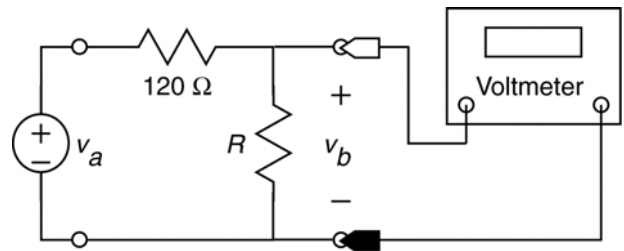
$$i_o = \underline{-0.5} \text{ A}$$



3. The input to this circuit is the voltage of the voltage source, v_a . The output of this circuit is the voltage measured by the voltmeter, v_b . This circuit produces an output that is proportional to the input, that is

$$v_b = k v_a$$

where k is the constant of proportionality.



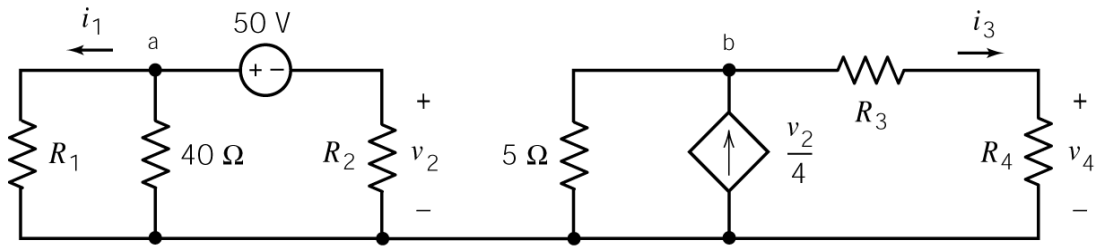
a.) When $R = 240 \text{ } \Omega$ and $v_a = 18 \text{ V}$, the output is $v_b = \underline{12} \text{ V}$.

b.) When $R = 240 \text{ } \Omega$ and $v_a = 18 \text{ V}$, the power supplied by the voltage source is 0.9 W.

c.) When $R = \underline{15} \text{ } \Omega$ and $v_a = 18 \text{ V}$, the output is $v_b = 2 \text{ V}$.

d.) When $R = \underline{30} \text{ } \Omega$, the output is $v_b = 0.2 v_a$. (That is, the constant of proportionality is $k = 0.2$.)

4.



Given that

$$i_1 = 0.625 \text{ A}, \quad v_2 = -25 \text{ V}, \quad i_3 = -1.25 \text{ A} \quad \text{and} \quad v_4 = -18.75 \text{ V}$$

Determine the values of R_1 , R_2 , R_3 and R_4 :

$$R_1 = \underline{\quad 40 \quad} \Omega, \quad R_2 = \underline{\quad 20 \quad} \Omega, \quad R_3 = \underline{\quad 5 \quad} \Omega \quad \text{and} \quad R_4 = \underline{\quad 15 \quad} \Omega.$$

5. The 12 V source supplies 720 mW and the 18 V source supplies 4.32 W. Determine the values of the resistances R_1 and R_2 .

$$R_1 = \underline{\quad 40 \quad} \Omega \quad \text{and} \quad R_2 = \underline{\quad 25 \quad}$$

