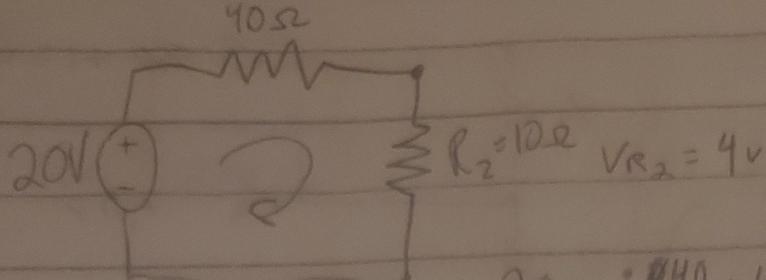
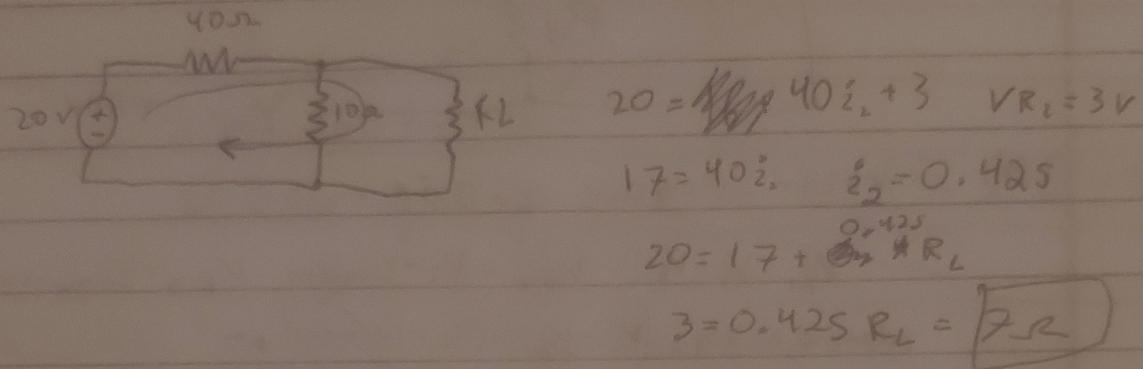


3.12

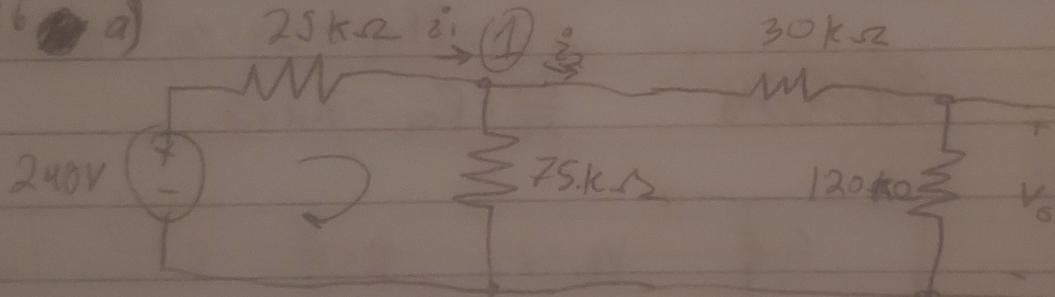


$$20 = i_1 \cdot 40 + 4 \Rightarrow \frac{16}{40} = i_1 \quad i_1 = 0.4A$$

$$20 = 16 + 0.4R_2 \Rightarrow 4 = 0.4R_2 \Rightarrow R_2 = 10$$



3.16 a)



$$R_{eq} = 75k\Omega$$

$$i_1 = \frac{240}{75} = 3.2mA \quad V_{75k\Omega} = 80V$$

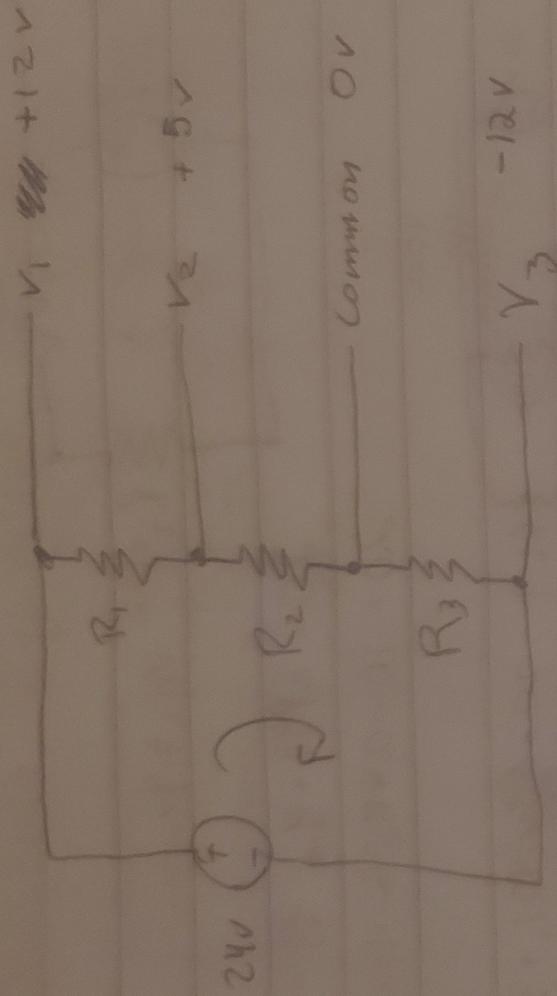
$$V_{75k\Omega} = V_{25k\Omega} - V_o = 160V$$

$$i_1 = \frac{80}{75k\Omega} + i_2 \Rightarrow i_2 = i_1 - \frac{80}{75k\Omega} = 2.1mA$$

$$V_o = 160 - 66 = 94V$$

$$V_{75k\Omega} = i_2 \cdot 30k\Omega = 66V$$

3.17



a) $V = 24V \quad P = 80W \quad I = 3.3A$

$$V_{R_1} = V_1 - V_2 \quad V_{R_2} = V_2 - \text{common} \quad V_{R_3} = \text{common} - V_3$$
$$V_{R_1} = V_1 - V_2 \quad V_{R_2} = (V_1 - V_2) + (V_2 - \text{common}) \quad \text{or}$$

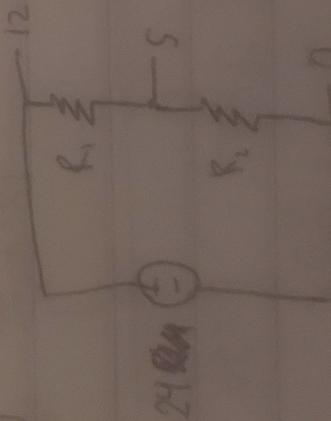
$$R_1 = \frac{V_{R_1}}{I} \quad R_2 = \frac{V_{R_2}}{I} \quad R_3 = \frac{V_{R_3}}{I} = R_{eq}$$

$$24 = I R_{eq} \Rightarrow 24 = V_{R_1} + V_{R_2} + V_{R_3}$$

$$\frac{24}{3.3} = R_{eq} = 7.25\Omega$$

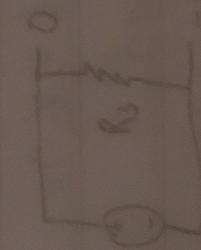
Answers

b)



$$V = \frac{V}{I} \quad R_1 = \frac{V}{3.33} = 2.1\Omega$$

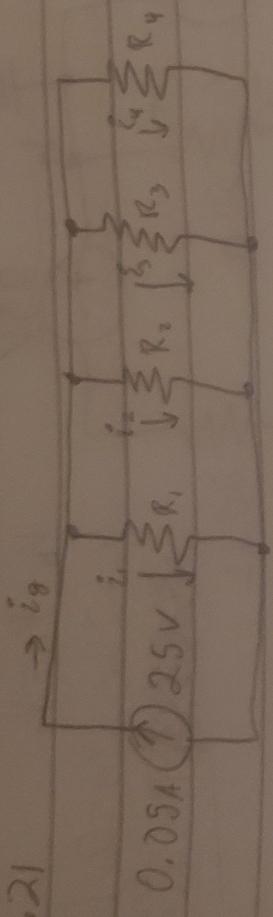
$$R_2 = \frac{V}{3.33} = 1.5\Omega$$



$$R_2 = \frac{V}{3.33} = 3.6\Omega$$

$$R_3 = \frac{V}{3.33} = 12\Omega$$

3.21



$$i_1 = 0.6i_a \quad i_3 = \frac{1}{R_1} = \frac{1}{kA} \quad i_4 = \frac{1}{R_2} = \frac{1}{kA}$$

$$i_3 = i_1 + i_2 + i_3 + i_4$$

$$i_3 = 0.6i_2 + i_2 + 2i_3 + 2i_4 \Rightarrow i_3 = 6i_2 + 2i_4 \Rightarrow i_3 = 6i_2 + \frac{0.03}{6} = 8.3mA$$

$$i_1 = 0.005$$

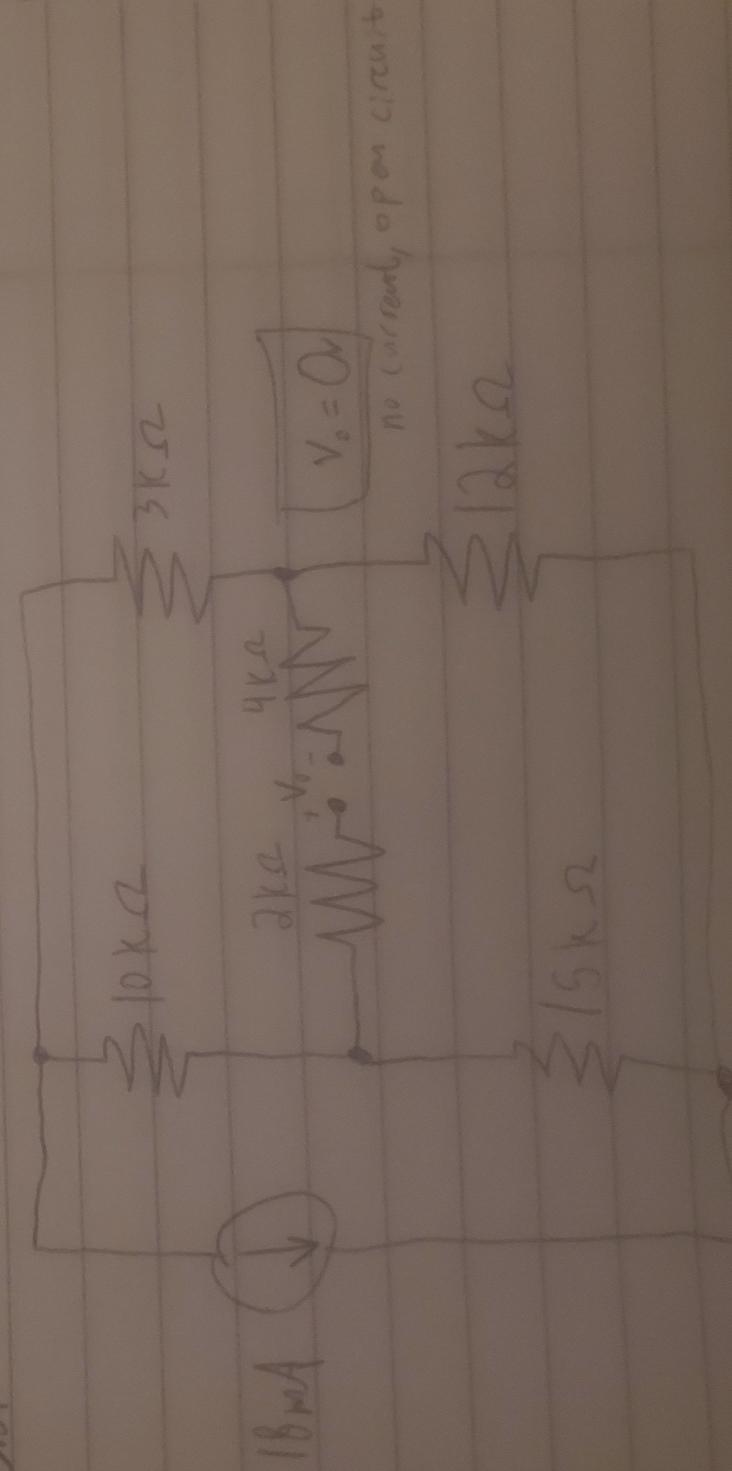
$$R_1 = \frac{V}{I} = \frac{25}{0.005} = 5k\Omega$$

$$i_2 = 0.0083 \quad R_2 = \frac{V}{I} = \frac{25}{0.0083} = 3k\Omega$$

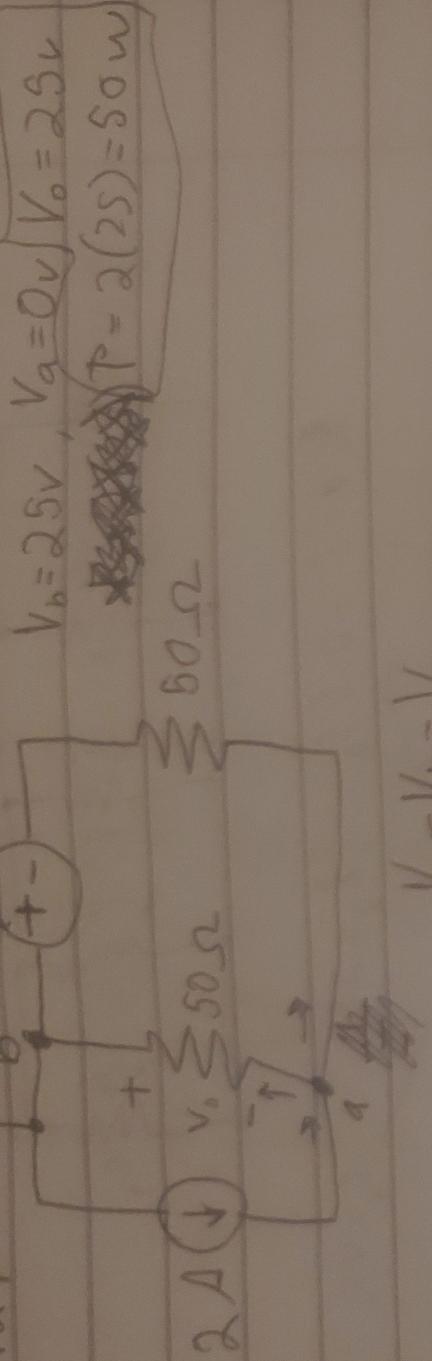
$$i_3 = 0.0166 \quad R_3 = \frac{V}{I} = \frac{25}{0.0166} = 1.5k\Omega$$

$$i_4 = 0.020 \quad R_4 = \frac{V}{I} = \frac{25}{0.020} = 1.25k\Omega$$

3.31



$$4.27 \quad \frac{25V}{+ -} \quad V_b - V_a = V_o \quad q)$$



$$V_a - V_b = V_o$$

$$V_b = 25V, V_a = 0V \quad V_o = 25V$$

$$P = 2(25) = 50W$$

b)

c) node a makes for a better choice because that make the circuit in passive configuration, meaning no negative polarities