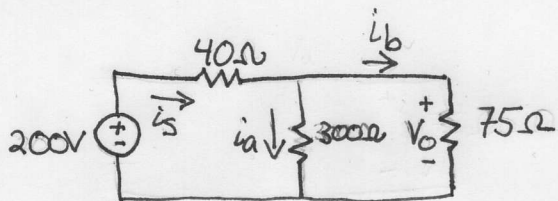


P 2.14



$$V = IR$$

$$P = IV = I^2 R$$

$$R_{eq} = \left(\frac{1}{300} + \frac{1}{75} \right)^{-1} + 40 = 100 \Omega$$

$$i_s = \frac{200}{100} = 2A$$

$$i_s = i_a + i_b$$

$$2 = \frac{V_o}{300} + \frac{V_o}{75}$$

$$2 = \frac{V_o}{60}$$

$$V_o = 120V$$

a) $i_a = \frac{120}{300} = 0.4A$

b) $i_b = \frac{120}{75} = 1.6A$

c) $V_o = 120V$ (from above)

d) $P_{R40} = i_s^2 R_{40} = (2)^2 (40) = 160W$

$P_{R300} = i_a V_o = 0.4(120) = 48W$ or $i_a^2 R_{300} = (0.4)^2 (300) = 48W$

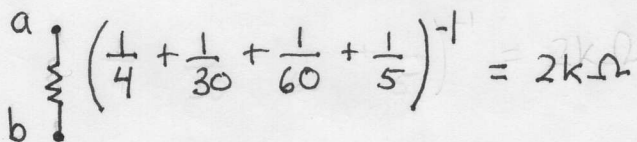
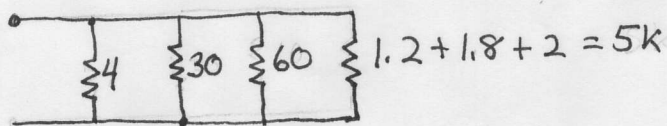
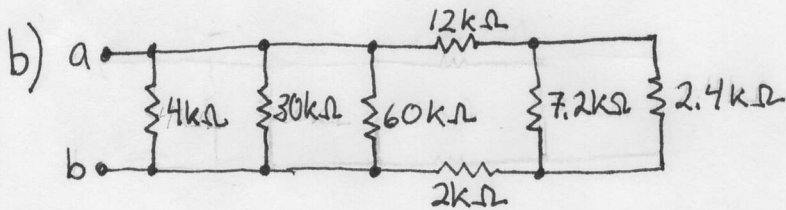
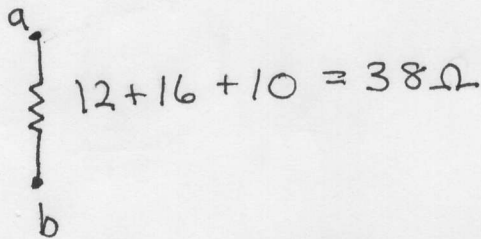
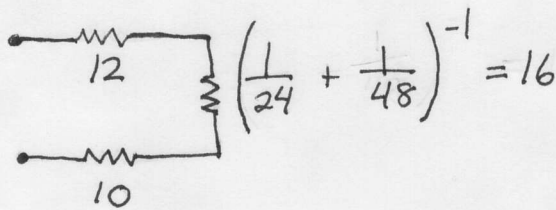
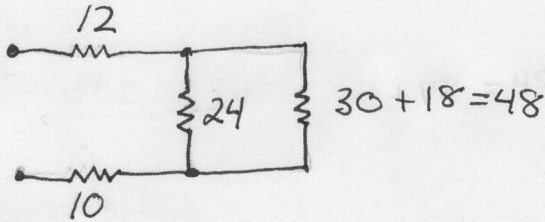
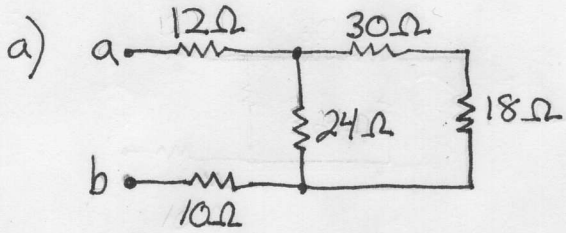
$P_{R75} = i_b V_o = 1.6(120) = 192W$ or $i_b^2 R_{75} = (1.6)^2 (75) = 192W$

e) $P_s = i_s V_s = 2(200) = 400W$

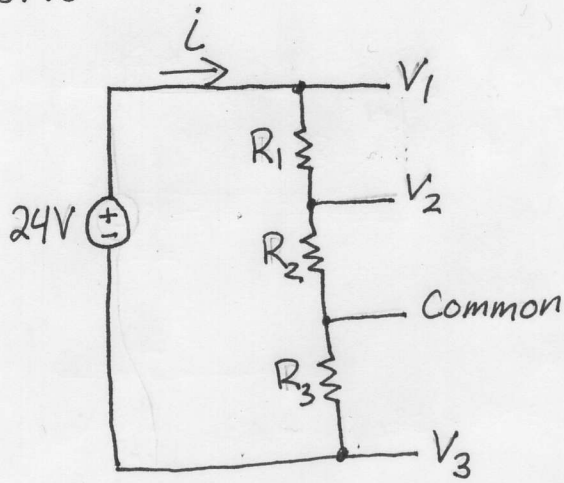
or

$P_s = P_{R40} + P_{R300} + P_{R75} = 160 + 48 + 192 = 400W$

P3.7



P 3.18



$$a) P_{TOT} = \frac{V^2}{R} = \frac{24^2}{R_1 + R_2 + R_3} = 36W$$

$$\Rightarrow R_1 + R_2 + R_3 = 16$$

$$i = \frac{V}{R_1 + R_2 + R_3} = \frac{24}{16} = 1.5A$$

$$b) V_1 = i (R_1 + R_2) = 12V$$

$$V_2 = i R_2 = 6V$$

$$V_3 = -i R_3 = -12V$$

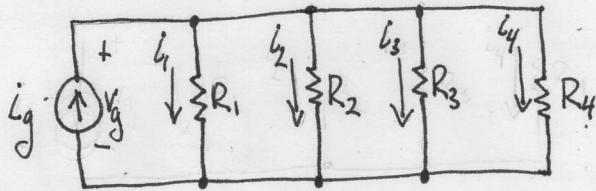
$$R_3 = \frac{12}{1.5} = 8\Omega$$

$$R_2 = \frac{6}{1.5} = 4\Omega$$

$$R_1 + R_2 = \frac{12}{1.5}$$

$$R_1 = \frac{12}{1.5} - 4 = 4\Omega$$

P3.21



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

$$i_3 = i_4$$

$$i_2 = 10i_3 = 10i_4$$

$$i_1 = 2i_2 = 2(10i_4) = 20i_4$$

$$i_g = 20i_4 + 10i_4 + i_4 + i_4$$

$$i_g = 32i_4$$

$$\Rightarrow i_4 = \frac{i_g}{32} = \frac{8\text{mA}}{32} = 0.25\text{mA}$$

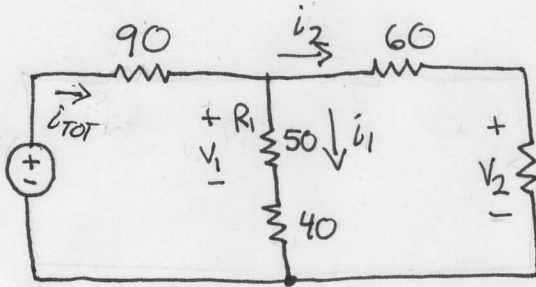
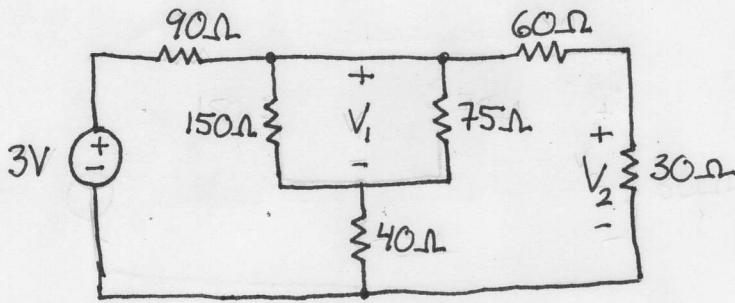
$$R_4 = \frac{V_g}{i_4} = \frac{4\text{V}}{0.25\text{mA}} = 16000\Omega = 16\text{k}\Omega$$

$$R_3 = \frac{V_g}{i_3} = \frac{V_g}{i_4} = 16000\Omega = 16\text{k}\Omega$$

$$R_2 = \frac{V_g}{i_2} = \frac{V_g}{10i_4} = \frac{4}{10(0.25\text{mA})} = 1600\Omega = 1.6\text{k}\Omega$$

$$R_1 = \frac{V_g}{i_1} = \frac{V_g}{20i_4} = \frac{4}{20(0.25\text{mA})} = 800\Omega = 0.8\text{k}\Omega$$

P 3.25



$$R_1 = \left(\frac{1}{150} + \frac{1}{75} \right)^{-1} = 50 \Omega$$

$$R_{TOT} = 90 + \left(\frac{1}{90} + \frac{1}{90} \right)^{-1} = 135 \Omega$$

$$i_{TOT} = \frac{V}{R_{TOT}} = \frac{3}{135} = 0.022 \text{ A} = \frac{1}{45} \text{ A}$$

$$(50 + 40)i_1 = (60 + 30)i_2$$

$$90i_1 = 90i_2 \Rightarrow i_1 = i_2$$

$$i_{TOT} = i_1 + i_2$$

$$i_{TOT} = 2i_1$$

$$\Rightarrow i_1 = \frac{i}{2} = \frac{1}{45} \cdot \frac{1}{2} = \frac{1}{90} \text{ A} = i_2$$

$$V_1 = 30i_2 = \frac{30}{90} = \frac{1}{3} \text{ A} = 0.3 \text{ A}$$

$$V_2 = 50i_1 = \frac{50}{90} = \frac{5}{9} \text{ A} = 0.5 \text{ A}$$