HW # 4

5-8

a. $R_T = R_1 + R_2 + R_3 = 10\,\Omega + 12\,\Omega + 18\,\Omega = \boxed{40\,\Omega = R_T}$

b. I? $\quad V = I \cdot R \quad \text{"} \quad I = \frac{V}{R} = \frac{72\,V}{40\,\Omega} = \boxed{1{,}8\,A = I}$

c. $V_{R1} = I_T \cdot R_1 = 1{,}8\,A \cdot 10\,\Omega = \boxed{18\,V = V_{R1}}$

$V_{R2} = I_T \cdot R_2 = 1{,}8\,A \cdot 12\,\Omega = \boxed{21{,}6\,V = V_{R2}}$

$V_{R3} = I_T \cdot R_3 = 1{,}8\,A \cdot 18\,\Omega = \boxed{32{,}4\,V = V_{R3}}$

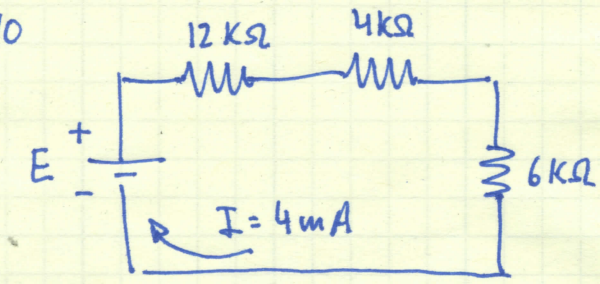
d. P?

$P = V \cdot I = 72\,V \cdot 1{,}8\,A = 129{,}6\,W$

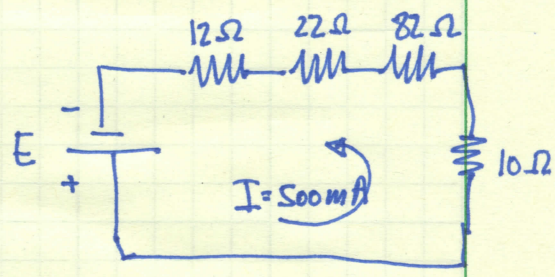
e. P_{R3}?

$P_{R3} = V_{R3} \cdot I_T = 32{,}4\,V \cdot 1{,}8\,A = \boxed{58{,}3\,W = P_{R3}}$

5-10



a)



b)

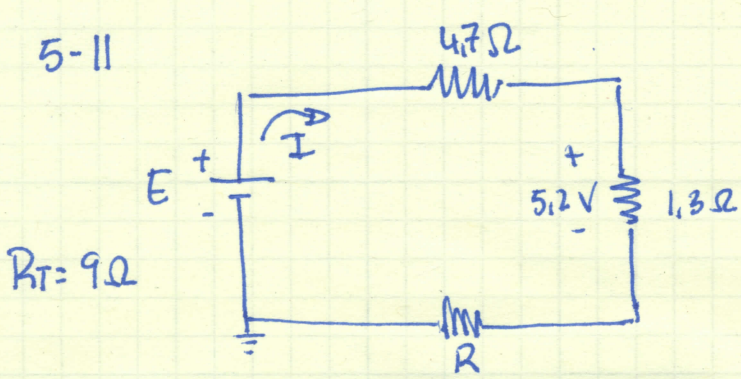
a) E? $\quad I_T = 4\,mA \quad R_T = 12\,K\Omega + 4\,K\Omega + 6\,K\Omega = 22\,K\Omega$

$E_T = I_T \cdot R_T = 4 \cdot 10^{-3}\,A \cdot 22 \cdot 10^{3}\,\Omega = \boxed{88\,V = E_T}$

b) E? $\quad I_T = 500\,mA \quad R_T = 12\,\Omega + 22\,\Omega + 82\,\Omega + 10\,\Omega = 126\,\Omega$

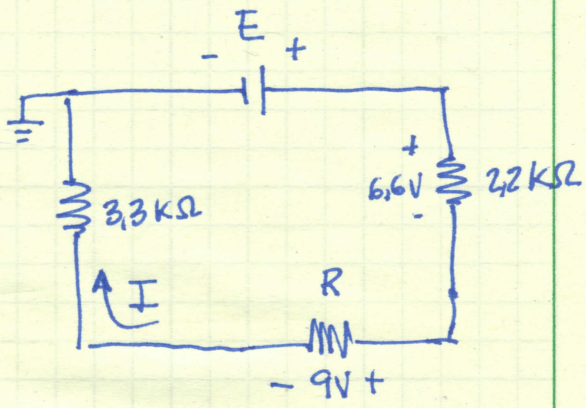
$E_T = I_T \cdot R_T = 500 \cdot 10^{-3}\,A \cdot 126\,\Omega = \boxed{63\,V = E_T}$

5-11



$R_T = 9\Omega$

I



II

I? E? R? V_x?

I) $R_T = 9\Omega$ $\quad V_{1,3\Omega} = I_T \cdot R_{1,3\Omega}$ „ $I_T = \frac{V_{1,3\Omega}}{R_{1,3\Omega}} = \frac{5,2\,V}{1,3\,\Omega} = \boxed{4A = I_T}$

$E_T = I_T \cdot R_T = 4A \cdot 9\Omega = \boxed{36\,V = E_T}$

$R_T = 4,7\Omega + 1,3\Omega + R = 9\Omega$ „ $\boxed{R = 3\Omega}$

$V_{4,7\Omega} = I_T \cdot R_{4,7} = 4A \cdot 4,7\Omega = \boxed{18,8\,V = V_{4,7\Omega}}$

$V_{1,3\Omega} = I_T \cdot R_{1,3} = 4A \cdot 1,3\Omega = \boxed{5,2\,V = V_{1,3\Omega}}$

$V_{3\Omega} = I_T \cdot R_{3\Omega} = 4A \cdot 3\Omega = \boxed{12\,V = V_{3\Omega}}$

II) $V_{2,2k\Omega} = I_T \cdot R_{2,2k\Omega}$ $\quad I_T = \frac{V_{2,2k\Omega}}{R_{2,2k\Omega}} = \frac{6,6\,V}{2,2 \cdot 10^3\,\Omega} = \boxed{3\,mA = I_T}$

$V_R = I_T \cdot R$ „ $R = \frac{V_R}{I_T} = \frac{9\,V}{3\,mA} = \boxed{3\,k\Omega = R}$

$R_T = 2,2\,k\Omega + 3\,k\Omega + 3,3\,k\Omega = \boxed{8,5\,k\Omega = R_T}$

$E_T = I_T \cdot R_T = 3 \cdot 10^{-3} \cdot 8,5 \cdot 10^3 = \boxed{25,5\,V = E_T}$

$V_{2,2\,k\Omega} = I_T \cdot R_T = \boxed{6,6\,V = V_{2,2}}$

$\boxed{V_R = 9\,V}$

$V_{3,3\,k\Omega} = I_T \cdot R_{3,3} = 3 \cdot 10^{-3}\,A \cdot 3,3 \cdot 10^3\,\Omega = \boxed{9,9\,V = V_{3,3}}$

5-21

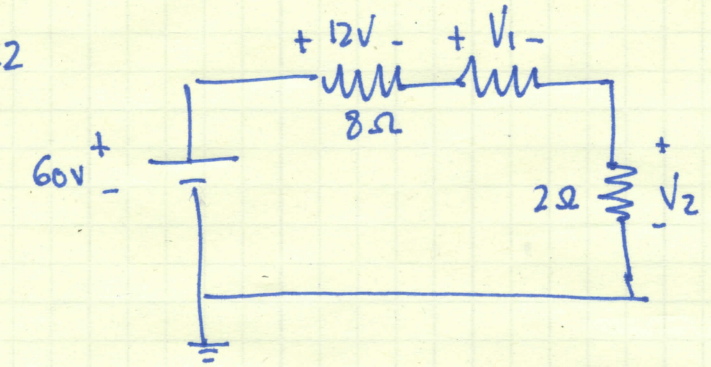
a. $\Sigma V = 0$ $\quad +10V - V - 12V + 4V = 0$ $\quad V = 10 - 12 + 4 = 2V$

b) $\Sigma V = 0$ $\quad +30 - V - 8 + 20 = 0$ $\quad V = 50 - 8 = 42V$

c) $\Sigma V = 0$ $\quad -6 + 36 - V_1 - 22 = 0$ $\quad V_1 = 36 - 28 = 8V$

$8V - 12V - V_2 = 0$ $\quad V_2 = -4V$

5-22



$$I_T = \frac{V_{8\Omega}}{R_{8\Omega}} = \frac{12V}{8\Omega} = \boxed{1.5A = I_T}$$

$$E_T = I_T \cdot R_T \quad .. \quad R_T = \frac{E_T}{I_T} = \frac{60V}{1.5A} = 40\Omega$$

$$R_T = 8\Omega + R + 2\Omega = 40\Omega \quad .. \quad \boxed{R = 30\Omega}$$

$$V_2 = I_T \cdot R_2 = 1.5A \cdot 2\Omega = \boxed{3V = V_2}$$

V_1? $\quad$ KVL $\quad \Sigma V = 0$

$$-60V + 12V + V_1 + 3V = 0$$

$$V_1 = 60V - 15V = \boxed{45V = V_1}$$