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CECS 211 Lab 3

1 a) 1.876 Ω

b) $R_T = \frac{1}{1/R_2 + 1/R_3 + 1/R_5}$

2a) 11 Ω

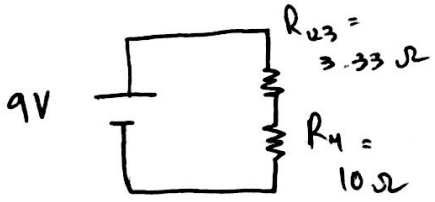
b) $R_T = R_1 + R_2 + R_4$

3a) V : 2.25 V

b) I : 6.75 mA

c) $R_{123} = R_1 \| R_2 \| R_3$

$R_{123} = \frac{1}{1/R_1 + 1/R_2 + 1/R_3} = \frac{1}{1/10 + 1/10 + 1/10} = 3.33\ \Omega$



$R_T = 13.33\ \Omega$

d) $I_T = 9/13.33 = 6.75$ mA

$V_T = I_T R_T = 0.675 \cdot 13.37 = 9$ V

1. $R_T = R_1 + R_3 \| R_4 + R_2$

$= 10\Omega + \frac{1}{\frac{1}{R_3} + \frac{1}{R_4}} + 15\Omega$

$R_T = 10\Omega + \frac{1}{\frac{1}{20} + \frac{1}{20}} + 15\Omega = 25 + \frac{1}{\frac{1}{10}} = \boxed{35\ \Omega}$

2. $R_T = R_5 + R_7 \| R_8$

$= 7.5\Omega + \frac{(R_7)(R_8)}{R_7 + R_8} = 7.5 + \frac{(15)(20)}{15+20} = 7.5 + 8.57$

$\boxed{R_T = 16.071\ \Omega}$

3. $R_T = R_{13} \parallel [(R_{10} \parallel R_{11}) + R_9 + (R_{10} \parallel R_{12})]$

$= R_{13} \parallel \left[\left(\frac{R_{10}R_{11}}{R_{10}+R_{11}}\right) + R_9 + \left(\frac{R_{10}R_{12}}{R_{10}+R_{12}}\right)\right]$

$= R_{13} \parallel \left[\frac{10(15)}{25} + 5.1 + \frac{6.8(13)}{19.8}\right]$

$= R_{13} \parallel (15.5646)$

$R_{subtotal}$

$$R_T = \frac{R_{13} \cdot R_{subtotal}}{R_{13} + R_{subtotal}} = \frac{10(15.5646)}{25.5646} = 6.0863\,\Omega$$

4. $R_T = (R_{14} + R_{17}) \parallel R_{19} \parallel (R_{15} + R_{18})$

$= R_{1417} \parallel R_{19} \parallel R_{1518}$

$$= \frac{1}{1/R_{1417} + 1/R_{19} + 1/R_{1518}} = \frac{1}{1/200 + 1/100 + 1/200} =$$

$$R_T = \frac{1}{4/200} = 50\,\Omega$$