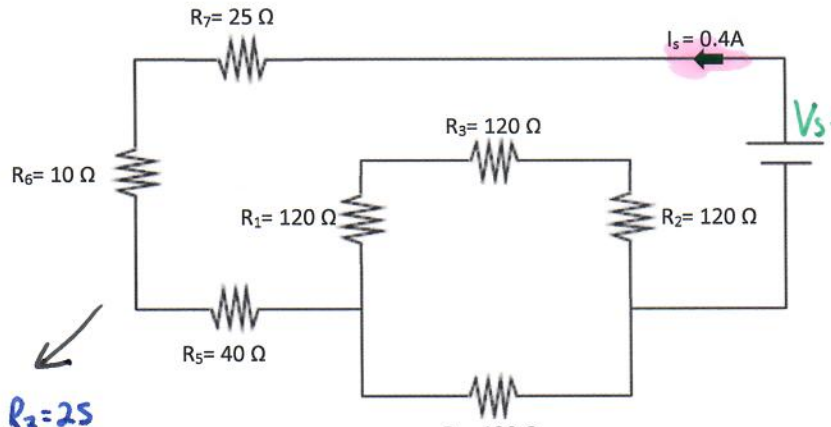
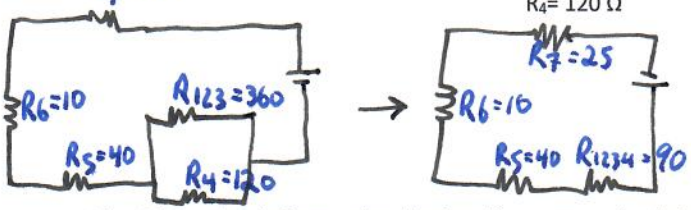
Practice Quiz: Resistance & Equivalent Resistance

name: SOLUTIONS

1) Calculate the Potential Difference of the power source.





① $R_{123} = R_1 + R_2 + R_3$

$R_{123} = 120 + 120 + 120$

$R_{123} = 360\,\Omega$

② $\frac{1}{R_{1234}} = \frac{1}{R_{123}} + \frac{1}{R_4}$

$\frac{1}{R_{1234}} = \frac{1}{360} + \frac{1}{120}$

$R_{1234} = 90\,\Omega$

③ $R_T = R_{1234} + R_5 + R_6 + R_7$

$R_T = 90 + 40 + 10 + 25$

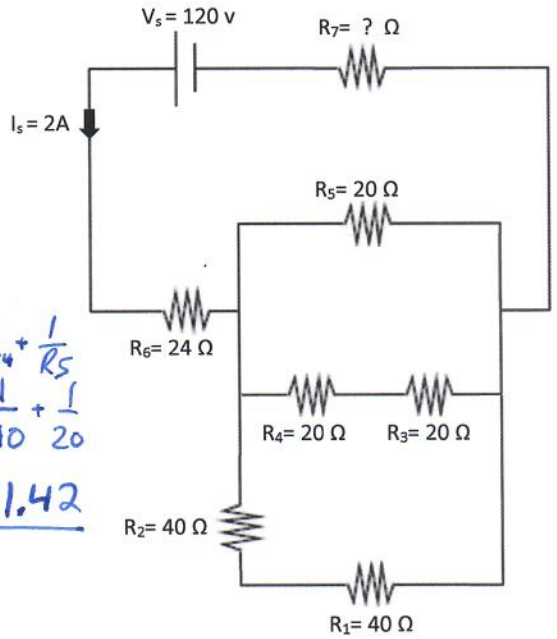
$R_T = 165\,\Omega$

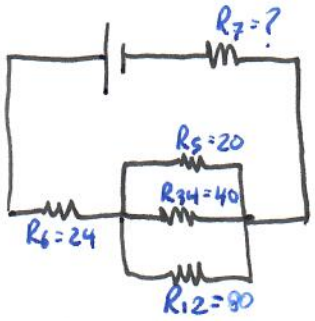
④ $V_s = I_s R_T$

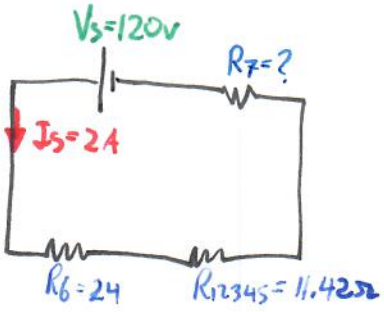
$V_s = 0.4(165)$

$V_s = 66\,V$

2) Given the information in the diagram, calculate the value of resistor R_7







① $R_{12} = R_1 + R_2$ $\quad R_{12} = 80\,\Omega$

$R_{12} = 40 + 40$

② $R_{34} = R_3 + R_4$ $\quad R_{34} = 40\,\Omega$

$R_{34} = 20 + 20$

③ $\frac{1}{R_{12345}} = \frac{1}{R_{12}} + \frac{1}{R_{34}} + \frac{1}{R_5}$

$\frac{1}{R_{12345}} = \frac{1}{80} + \frac{1}{40} + \frac{1}{20}$

$R_{12345} = 11.42$

④ $R_T = \frac{V_s}{I_s}$

$R_T = \frac{120}{2}$

$R_T = 60\,\Omega$

⑤ $R_T = R_{12345} + R_6 + R_7$

$60 = 11.42 + 24 + R_7$

$R_7 = 24.6\,\Omega$