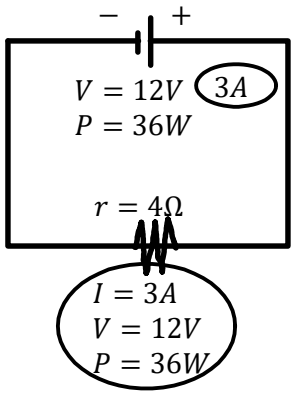
P12 - 9.1 - V=IR P=IV Q=I/T Series Parallel Circuits Notes



$V = IR$ $\quad I = \frac{12}{4}$ $\quad I = 3A$

$P = IV$ $\quad P = 3(12)$ $\quad P = 36W$

$P = I^2R$ $\quad P = 3^2(4)$ $\quad P = 36W$

$I = \frac{Q}{t}$ $\quad Q = It$ $\quad Q = 3(1)$ $\quad Q = 3C$

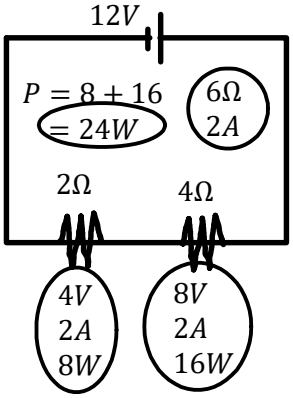
How many electrons in 1s?

$3\,C \times \frac{6.24E18e^-}{1C} = 1.87E19e^-$

$1e^- \times 1.9 \times 10^{-19}C$

Check: Ohm's Law/Series/Parallel/Loop/Junction Rules

Series $\quad I_T = I_1 = I_2$



R_T 1st $\quad 2\Omega \quad 4\Omega$

$R_T = R_1 + R_2$ $\quad R_T = 2 + 4$ $\quad R_T = 6\Omega$

$V = IR$ $\quad V = 2(2)$ $\quad V = 4V$

$V = IR$ $\quad V = 2(4)$ $\quad V = 8V$

Total

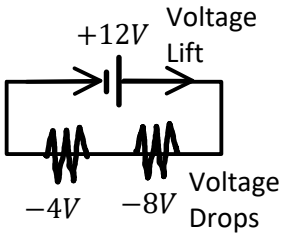
$V = IR$ $\quad I = \frac{12}{6}$ $\quad I = 2\,C$

Check $\quad V_T = V_1 + V_2$ $\quad 12 = 4 + 8$ ✓

$P = IV$ $\quad P = 2(4)$ $\quad P = 8W$

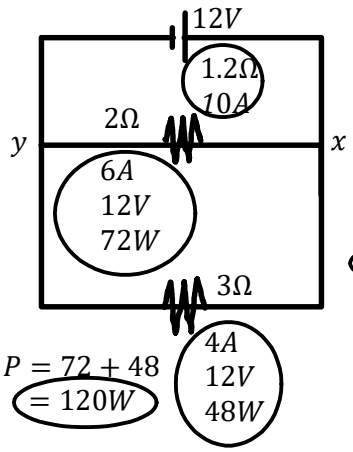
$P = IV$ $\quad P = 2(8)$ $\quad P = 16W$

Loop Rule: $\sum V = 0$



$-8V - 4V + 12V = 0$

Parallel $\quad V_T = V_1 = V_2$



R_T 1st

$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$ $\quad \frac{1}{R_T} = \frac{1}{2} + \frac{1}{3}$ $\quad \frac{1}{R_T} = \frac{5}{6}$ $\quad R_T = 1.2\,\Omega$

2Ω $\quad V = IR$ $\quad I = \frac{12}{2}$ $\quad I = 6A$

3Ω $\quad V = IR$ $\quad I = \frac{12}{3}$ $\quad I = 4A$

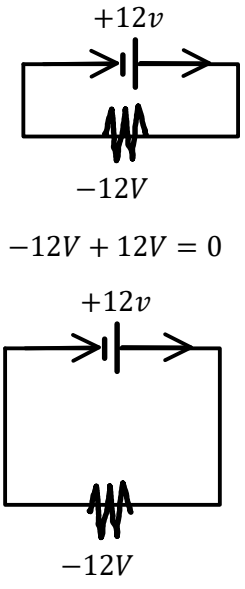
Check $\quad I_T = I_1 + I_2$ $\quad 10 = 6 + 4$ ✓

$V = IR$ $\quad I = \frac{12}{1.2}$ $\quad I = 10A$

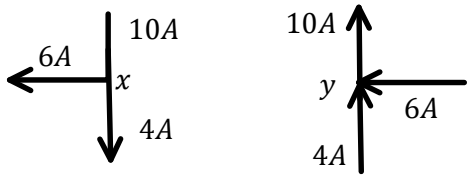
$P = IV$ $\quad P = 6(12)$ $\quad P = 72W$

$P = IV$ $\quad P = 4(12)$ $\quad P = 48W$

Loop Rule: $\sum V = 0$



Junction Rule: $\quad I_A + I_B + \cdots + I_n = I_C$



$10A = 6A + 4A$ $\quad 6A + 4A = 10A$

*Two Resistors!

$R_T^* = \frac{R_1 R_2}{R_1 + R_2}$ $\quad R_T^* = \frac{2(3)}{2+3}$ $\quad R_T^* = 1.2\Omega$