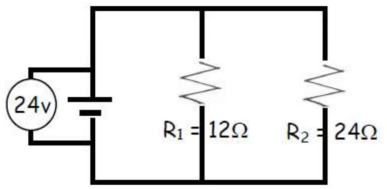
Tuesday, April 21, 2020 12:05 PM

Name _____ Unit 11: Electricity
Regents Physics Mr. Mellon

PARALLEL CIRCUIT PRACTICE

Remember that in a parallel circuit:

- the **current** in the branches of the circuit (is the same **or** adds up).
- the **voltage** drops across each branch (is the same **or** adds up to) the total voltage.
- to calculate total **resistance**, (add **or** use reciprocals).



R_{eq} = 8Ω I_T = 3A V_1 = 24V
V_2 = 24V I_1 = 2A I_2 = 1A

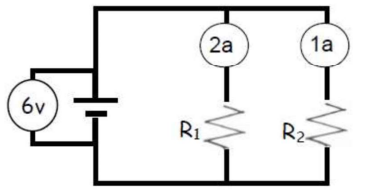
	V	I	R	P
1	24V	2A	12Ω	
2	24V	1A	24Ω	
T	24V	3A	8Ω	

$R_{EQ} = \left(\frac{1}{R_1} + \frac{1}{R_2}\right)^{-1} = \left(\frac{1}{12\Omega} + \frac{1}{24\Omega}\right)^{-1} = 8\Omega$

$I_T = \frac{V_T}{R_T} = \frac{24V}{8\Omega} = 3A$

$I_1 = \frac{V_1}{R_1} = \frac{24V}{12\Omega} = 2A$

$I_2 = \frac{V_2}{R_2} = \frac{24V}{24\Omega} = 1A$



V_1 = 6V V_2 = 6V
R_1 = 3Ω R_2 = 6Ω R_{eq} = 2Ω
I_1 = 2A I_2 = 1A I_T = 3A

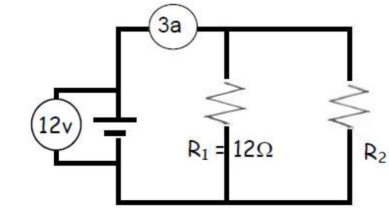
	V	I	R	P
1	6V	2A	3Ω	
2	6V	1A	6Ω	
T	6V	3A	2Ω	

$I_T = I_1 + I_2 = 2A + 1A = 3A$

$R_1 = \frac{V_1}{I_1} = \frac{6V}{2A} = 3\Omega$

$R_2 = \frac{V_2}{I_2} = \frac{6V}{1A} = 6\Omega$

$R_T = \frac{V_T}{I_T} = \frac{6V}{3A} = 2A$



V_1 = 12V V_2 = 12V
I_T = 3A I_1 = 1A I_2 = 2A
R_2 = 6Ω R_{eq} = _____

	V	I	R	P
1	12V	1A	12Ω	
2	12V	2A	6Ω	
T	12V	3A	4Ω	

$I_1 = \frac{V_1}{R_1} = \frac{12V}{12\Omega} = 1A$

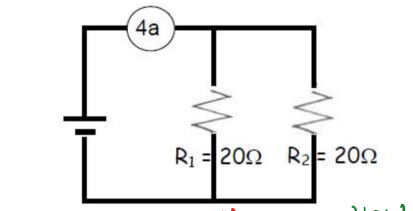
$R_2 = \frac{V_2}{I_2} = \frac{12V}{2A} = 6\Omega$

$R_T = \frac{V_T}{I_T} = \frac{12V}{3A} = 4\Omega$

$I_T = I_1 + I_2$

$I_2 = I_T - I_1$

$I_2 = 3A - 1A = 2A$



R_{eq} = 10Ω I_T = 4A V_T = 40V
V_1 = 40V I_1 = 2A I_2 = 2A

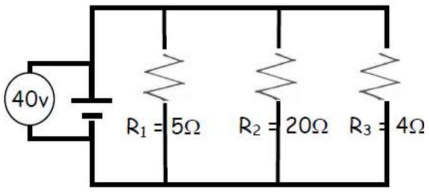
	V	I	R	P
1	40V	2A	20Ω	
2	40V	2A	20Ω	
T	40V	4A	10Ω	

$R_{EQ} = \left(\frac{1}{R_1} + \frac{1}{R_2}\right)^{-1} = \left(\frac{1}{20\Omega} + \frac{1}{20\Omega}\right)^{-1} = 10\Omega$

$V_T = I_T R_T = (4A)(10\Omega)$
$V_T = 40V$

$I_1 = \frac{V_1}{R_1} = \frac{40V}{20\Omega} = 2A$

$I_2 = \frac{V_2}{R_2} = \frac{40V}{20\Omega} = 2A$



R_{eq} = 2Ω I_T = 20A
V_1 = 40V V_2 = 40V V_3 = 40V
I_1 = 8A I_2 = 2A I_3 = 10A

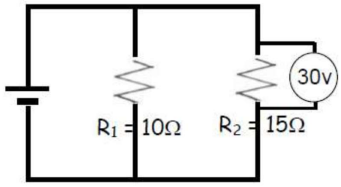
	V	I	R	P
1	40V	8A	5Ω	
2	40V	2A	20Ω	
3	40V	10A	4Ω	
T	40V	20A	2Ω	

$R_T = \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}\right)^{-1}$

$R_T = \left(\frac{1}{5\Omega} + \frac{1}{20\Omega} + \frac{1}{4\Omega}\right)^{-1} = 2\Omega$

$I_T = \frac{V_T}{R_T} = \frac{40V}{2\Omega} = 20A$

$I_1 = \frac{V_1}{R_1} = \frac{40V}{5\Omega} = 8A$



V_1 = 30V V_T = 30V
I_1 = 3A I_2 = 2A
R_{eq} = 6Ω I_T = 5A

	V	I	R	P
1	30V	3A	10Ω	
2	30V	2A	15Ω	
T	30V	5A	6Ω	

$I_1 = \frac{V_1}{R_1} = \frac{30V}{10\Omega} = 3A$ $I_2 = \frac{V_2}{R_2} = \frac{30V}{15\Omega} = 2A$

$I_T = I_1 + I_2 = 3A + 2A = 5A$

$R_T = \frac{V_T}{I_T} = \frac{30V}{5A}$

$R_T = 6\Omega$