Key

UIL Circuits

P12. Jack has a circuit with three resistors connected in series. Their respective resistances are 6.00 Ω, 9.00 Ω and 15.0 Ω. If he connects this arrangement to a 12.0-V battery, what is the voltage drop across the 9.00-Ω resistor?

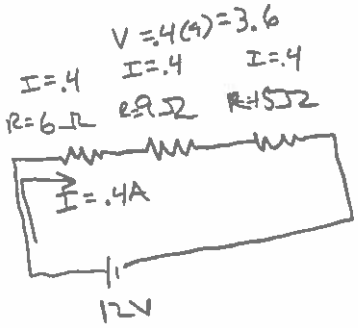
A) 7.20 V
B) 6.00 V
C) 4.80 V
D) 3.60 V
E) 2.40 V

$V = IR$

$R_T = 30$

$V_T = 12$

$I_T = .4$



P12. Eric has a circuit with four resistors connected in parallel. Their respective resistances are 6.00 Ω, 9.00 Ω, 12.0 Ω and 15.0 Ω. If he connects this arrangement to a 24.0-V battery, what is the current that flows through the 12.0-Ω resistor?

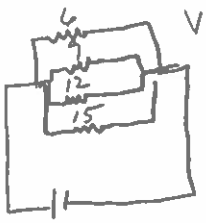
A) 1.52 A
B) 1.64 A
C) 1.76 A
D) 1.88 A
E) 2.00 A

$V = IR$

$R_T = \left(\frac{1}{6} + \frac{1}{9} + \frac{1}{12} + \frac{1}{15}\right)^{-1} = 2.34\,\Omega$

$V_T = 24V$

$I_T = 10.27A$



V=24 in all of them

$I = \frac{V}{R} = \frac{24}{12} = 2A$

P12. Joe has three resistors that have respective resistances of 18.0 Ω, 24.0 Ω and 36.0 Ω. He connects them in series and then connects this arrangement to a 12.0-V battery. Find the voltage drop across the 24-Ω resistor.

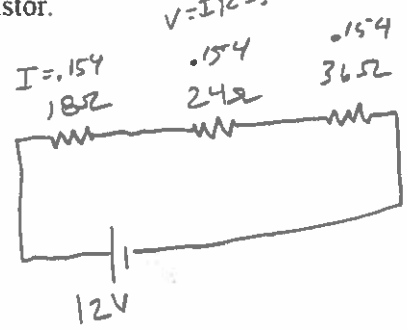
A) 2.77 V
B) 3.23 V
C) 3.69 V
D) 4.57 V
E) 5.44 V

$R_T = 78\,\Omega$

$V_T = 12V$

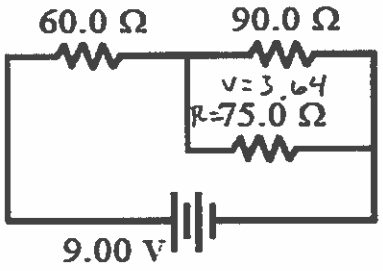
$I_T = .154A$

$V = IR = .154(24) = 3.69$



P07. Given the circuit shown, what is the current flowing in the 75.0 Ω resistor?

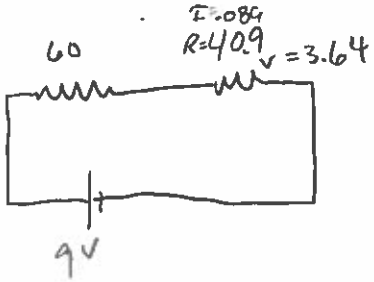
$(\frac{1}{60}+\frac{1}{75})^{-1}=$



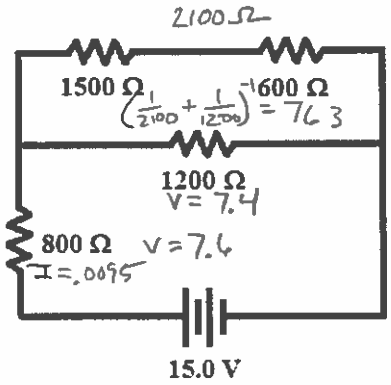
$\frac{3.64}{75}=.048$

A) 120 mA
B) 89.2 mA
(C) 48.6 mA
D) 40.5 mA
E) 19.8 mA

$R_T=100.9$
$V_T=9V$
$I_T=.089$



P07. Given the circuit shown, determine the current flowing through the 1200Ω resistor.



(A) 6.10 mA
B) 7.50 mA
C) 9.59 mA
D) 10.1 mA
E) 12.5 mA

$R_T=1563\Omega$
$V_T=15V$
$I_T=.0095A$

$V=IR$
$7.4=I(1200)$
$I=.0061$

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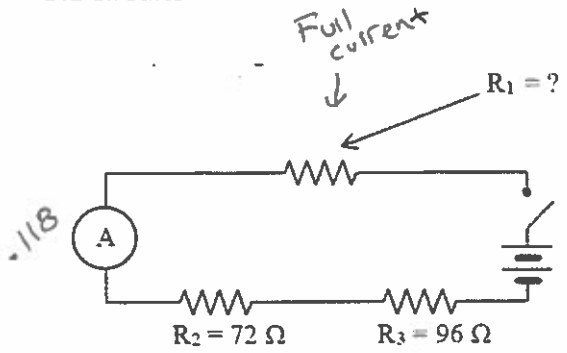
UIL Circuits



$R_T = 168 + R_1$

$V_T = 24\ V$

$I_T = .118\ A$

$V_T = I_T R_T$

$24 = .118(168 + R_1)$

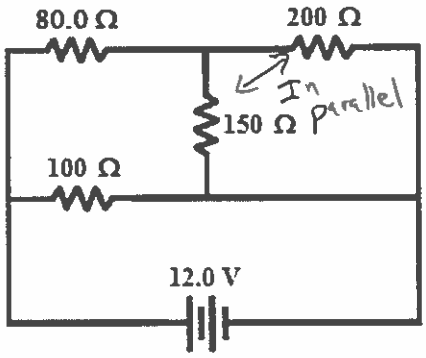
$R_1 = 35.4$

P12. Christina has a circuit with a 24.0-V battery, a switch, three resistors, and an ammeter. When the switch is closed, the ammeter reads 0.118 A. What is the resistance of the top resistor?

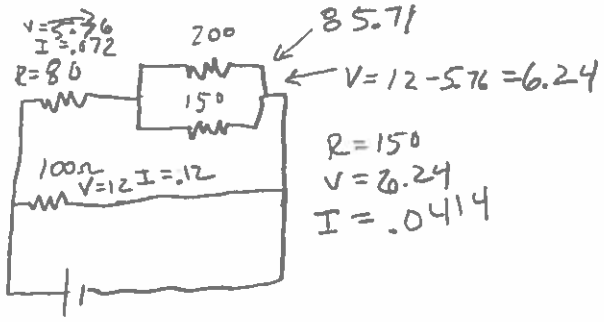
A) 35.4 Ω
B) 37.6 Ω
C) 39.8 Ω
D) 42.0 Ω
E) 44.2 Ω

P08. Given the following circuit, what is the current flowing in the 150.0 Ω resistor?

hard



think like this →



$R_T = \left(\frac{1}{165.71} + \frac{1}{100}\right)^{-1} = 62.36\ \Omega$

$V_T = 12V$

$I_T = .192A$

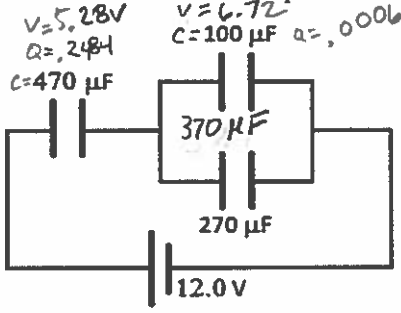
A) 23.4 mA
B) 30.4 mA
C) 41.4 mA
D) 52.7 mA
E) 72.4 mA

P12. Joe has three capacitors that have respective capacitances of 246 nF, 432 nF and 678 nF. If he connects them in series, what will the net capacitance be?

A) 1360 nF
B) 1050 nF
C) 741 nF
D) 434 nF
E) 127 nF

$\left(\frac{1}{246} + \frac{1}{432} + \frac{1}{678}\right)^{-1} = 127$

P08. Given the capacitor circuit shown, what is the charge stored on the 100μF capacitor? You may assume the circuit is in equilibrium.



$C_T = \left(\frac{1}{470} + \frac{1}{370}\right)^{-1} = 207.024\,\mu F$

$V_T = 12\,V$

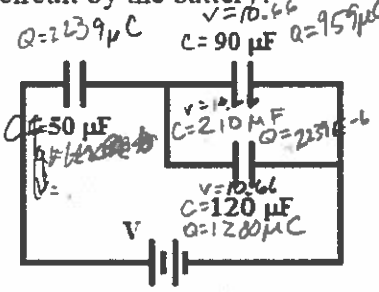
$Q_T = 12(207.024) \approx 2484\,\mu C$

A) 161 μC
B) 671 μC
C) 1200 μC
D) 2140 μC
E) 2720 μC

$C = \frac{Q}{V}$

$Q = CV$

P12. If the charge stored on the 120μF capacitor in this circuit is known to be 1280μC, what is the voltage supplied to the circuit by the battery?



$C_T = \left(\frac{1}{50} + \frac{1}{210}\right)^{-1} = 40.38\,\mu F$

$Q_T = 959 + 1280 = 2239\,\mu C$

$V_T = 56\,V$

A) 55.5 V
B) 36.3 V
C) 31.7 V
D) 21.6 V
E) 10.7 V

$C = \frac{Q}{V}$

$V = \frac{Q}{C}$

$Q = CV$