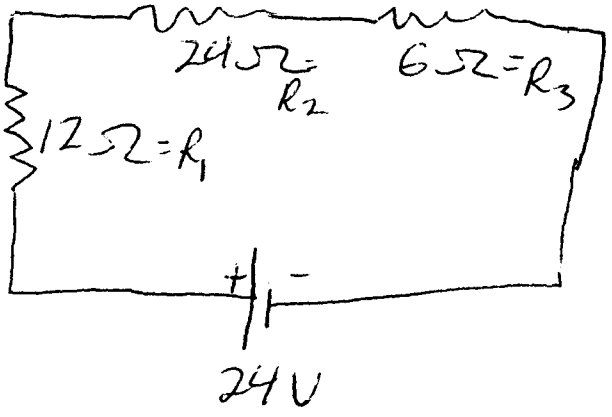
Electric Current + Circuits
Problems 38-42: series Circuits

(38)



Current?

1st Find $R_{EQ} = R_1 + R_2 + R_3$

$R_{EQ} = 12\Omega + 24\Omega + 6\Omega$

$R_{EQ} = 42\Omega$

Use $V = IR$ to find I. $I = \frac{V}{R_{EQ}} = \frac{24V}{42\Omega}$

$I = 0.57A$ ↑ for all resistors

Voltage Drops

$V_1 = IR_1 = 0.57A \cdot 12\Omega = 6.84V$ (6.9V)

$V_2 = IR_2 = 0.57A \cdot 24\Omega = 13.68V$ (13.7V)

$V_3 = IR_3 = 0.57A \cdot 6\Omega = 3.42V$ (3.4V)

V_{total} $23.94V$ (24V)

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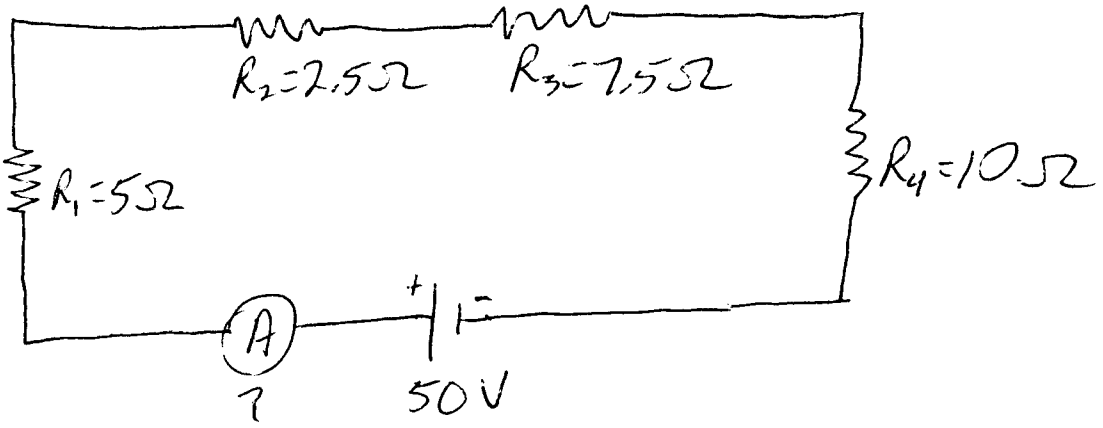

$$I = \frac{V}{R_{E2}} = \frac{50V}{(5\Omega + 2.5\Omega + 7.5\Omega + 10\Omega)} = \frac{50V}{25\Omega} = 2A$$

I: Current through each resistor

$V_1 = IR_1 = 2A \cdot 5\Omega = 10V$

$V_2 = IR_2 = 2A \cdot 2.5\Omega = 5V$

$V_3 = IR_3 = 2A \cdot 7.5\Omega = 15V$

$V_4 = IR_4 = 2A \cdot 10\Omega = 20V$

$+ \quad 50V$

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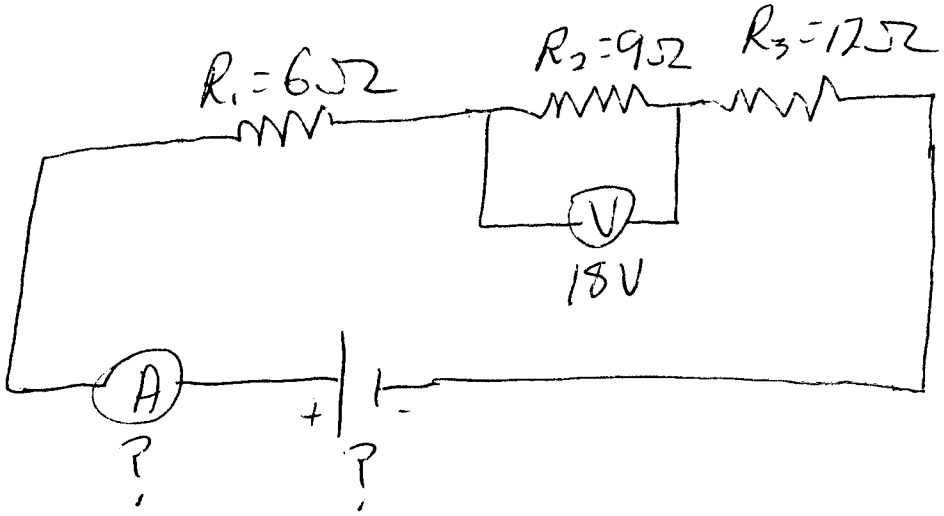

First find $I = \frac{V_2}{R_2} = \frac{18V}{9\Omega}$ = 2A

$V_{Battery} = IR_1 + IR_2 + IR_3$ or $I(R_1 + R_2 + R_3)$

$2A(6\Omega + 9\Omega + 12\Omega) = 2A \cdot 27\Omega$

= 54V

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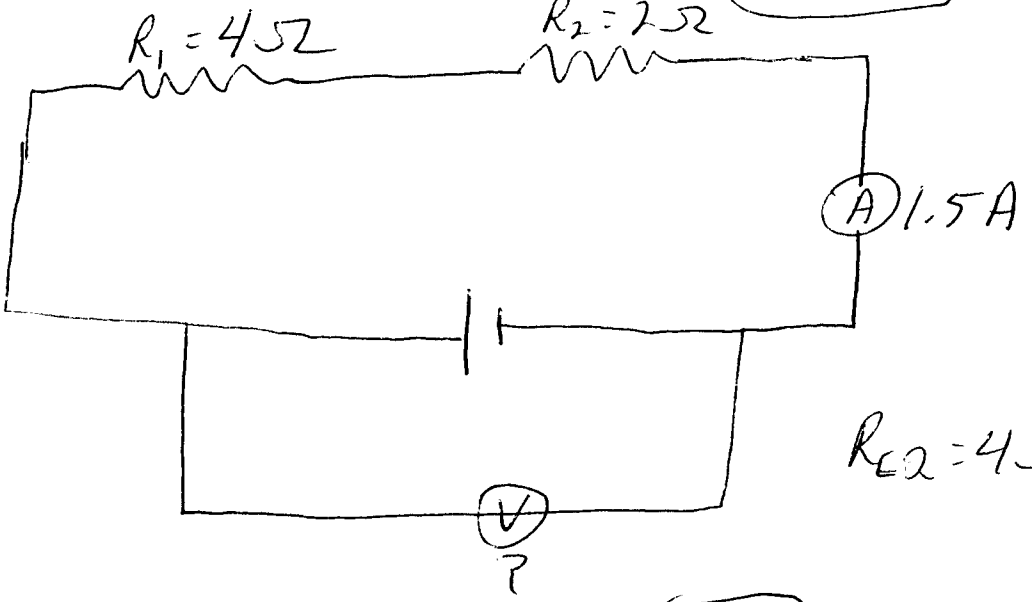
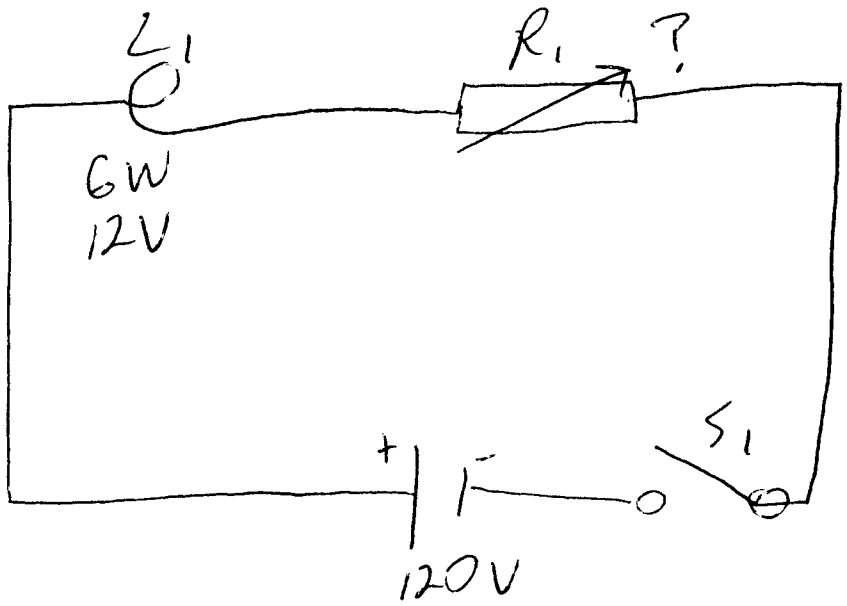


$R_{E2} = 4\Omega + 2\Omega = 6\Omega$

$V_{Batt} = IR_{E2} = 1.5A(6\Omega)$ = 9V

(42)



First, find current knowing that P = IV.

$$\text{So } I = \frac{P}{V} = \frac{6\ \frac{J}{s}}{12\ \frac{J}{C}} = 0.5\ \frac{C}{s} = \boxed{0.5A}$$

Voltage Drop across $R_1 = 120V - 12V = 108V$
($R V_{Total} - V_{L1}$)

$$R = \frac{V}{I} = \frac{108V}{0.5A} = \boxed{216\Omega}$$