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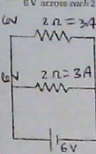
Parallel Circuits

25 In the circuit shown below, there is a voltage drop of 6 V across *each* 2-Ω resistor.

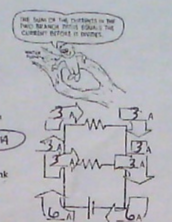
$I = \frac{V}{R} = \frac{6V}{2\Omega} = 3A$



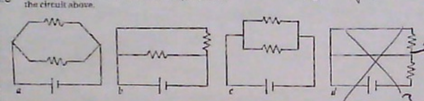
a. By Ohm's law, the current in *each* resistor is 3 A.

b. The current through the battery is the sum of the currents in the resistors, 6 A (3A+3A)

c. Fill in the current in the eight blank spaces in the view of the *same* circuit shown again at the right.



26 Cross out the circuit below that is *not* equivalent to the circuit above.



2 resistors on same branch

V-drop same for all Resistors

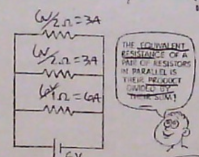
27 Consider the parallel circuit at the right.

a. The voltage drop across each resistor is 6V V.

b. The current in each branch is:
2-Ω resistor 3 A
2-Ω resistor 3 A
1-Ω resistor 6 A

b. The current through the battery equals the sum of the currents which equals 12 A. (6+3+3)

c. The equivalent resistance of the circuit equals .5 Ω.



$I = \frac{V}{R}$ $R_{tot} = \frac{V}{I} = \frac{6V}{12A} = 0.5\Omega$

$R_{tot} = \frac{R_1 \cdot R_2 \cdot R_3}{R_1 + R_2 + R_3} = \frac{2 \cdot 2 \cdot 1}{2+2+1} = \frac{4}{5} = 0.8\Omega$?

Conceptual PHYSICS

$R_{tot} = \frac{1}{2} + \frac{1}{2} + \frac{1}{1} =$

$0.5 + 0.5 + 1 = 2$?

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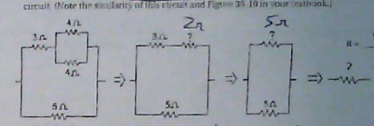
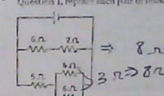
Compound Circuits

28 The initial circuit, below left, is a compound circuit made of a combination of resistors. It is reduced to a single equivalent resistance by the three steps, the circuits to its right, *a*, *b*, *c*. In step *a*, show the equivalent resistance of the parallel 4-Ω resistors. In step *b* combine this in series with the 3-Ω resistor. In step *c*, combine the last parallel pair to obtain the equivalent resistance of the circuit. (Note the similarity of this circuit and Figure 35.10 in your textbook.)



R = 2.5Ω

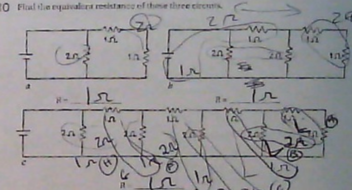
29 The circuit below is similar to Figure 35.11 in your textbook. In three successive steps, as in Question 1, replace each pair of resistors by a single resistor of equivalent resistance.



⇒ 8Ω > 4Ω
3Ω ⇒ 8Ω

R = 4Ω

30 Find the equivalent resistance of these three circuits.



a. R = 1Ω

b. R = 1Ω

c. R = 1Ω

Conceptual PHYSICS

Parallel

tot Resistance = less than each resistor
- if in pairs then ½ value of 1 Resistor

Current = Sum of all branches