

19. Using electron flow, the polarity of a resistor's voltage drop is

- positive on the side where electrons enter and negative on the side where they leave.
- negative on the side where electrons enter and positive on the side where they leave.

c. opposite to that obtained with conventional current flow.

d. both b and c.

20. The schematic symbol for earth ground is

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Essay Questions

- Show how to connect two resistances in series across a dc voltage source.
- State three rules for the current, voltage, and resistance in a series circuit.
- For a given amount of current, why does a higher resistance have a larger voltage drop across it?
- Two 300-W, 120-V lightbulbs are connected in series across a 240-V line. If the filament of one bulb burns open, will the other bulb light? Why? With the open circuit, how much is the voltage across the source and across each bulb?
- Prove that if $V_T = V_1 + V_2 + V_3$, then $R_T = R_1 + R_2 + R_3$.
- State briefly a rule for determining the polarity of the voltage drop across each resistor in a series circuit.
- State briefly a rule to determine when voltages are series-aiding.
- In a series string, why does the largest R dissipate the most power?
- Give one application of series circuits.
- In Fig. 4-18, explain why R_T , I , V_1 , V_2 , and V_3 are not affected by the placement of the ground at different points in the circuit.

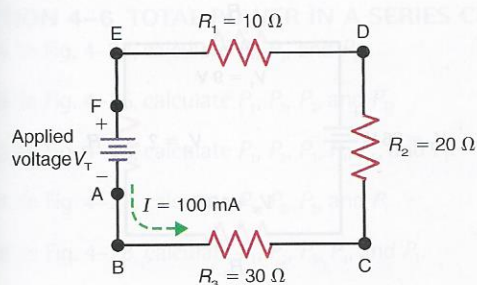
Problems

SECTION 4-1 WHY I IS THE SAME IN ALL PARTS OF A SERIES CIRCUIT

4-1 **MultiSim** In Fig. 4-23, how much is the current, I , at each of the following points?

- Point A
- Point B
- Point C
- Point D
- Point E
- Point F

Figure 4-23



4-2 In Fig. 4-23, how much is the current, I , through each of the following resistors?

- R_1
- R_2
- R_3

4-3 If R_1 and R_3 are interchanged in Fig. 4-23, how much is the current, I , in the circuit?

SECTION 4-2 TOTAL R EQUALS THE SUM OF ALL SERIES RESISTANCES

4-4 **MultiSim** In Fig. 4-24, solve for R_T and I .

4-5 **MultiSim** Recalculate the values for R_T and I in Fig. 4-24 if $R_1 = 220 \Omega$ and $R_2 = 680 \Omega$.

Figure 4-24

