**5–19** In Fig. 5–22 assume that a 100-Ω resistor, $R_4$, is added to the right of resistor, $R_3$. How much is the current in the wire between points

a. A and B?

b. B and C?

c. C and D?

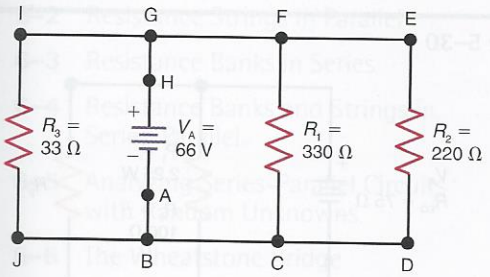
d. E and F?

e. F and G?

f. G and H?

**5–20** In Fig. 5–23, solve for $I_1$, $I_2$ $I_3$, and $I_T$.

**Figure 5–23**




**5–21** In Fig. 5–23, how much is the current in the wire between points

a. A and B?

b. B and C?

c. C and D?

d. E and F?

e. F and G?

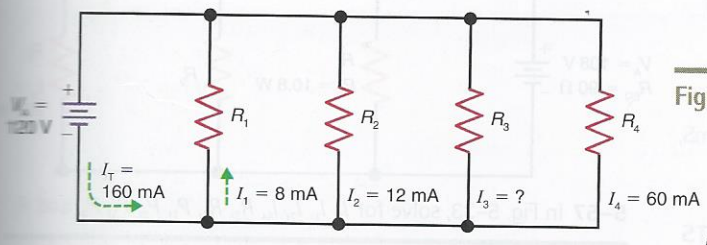
f. G and H?

g. G and I?

h. B and J?

**5–22** In Fig. 5–24, apply Kirchhoff's current law to solve for the unknown current, $I_3$.

**Figure 5–24**




**5–23** Two resistors $R_1$ and $R_2$ are in parallel with each other and a dc voltage source. How much is $I_2$ through $R_2$ if $I_T$ = 150 mA and $I_1$ through $R_1$ is 60 mA?

## SECTION 5–4 RESISTANCES IN PARALLEL

**5–24** In Fig. 5–19, solve for $R_{EQ}$.

**5–25** In Fig. 5–19, re-solve for $R_{EQ}$ if a 10-Ω resistor, $R_3$ is added across points G and H.

**5–26** In Fig. 5–20, solve for $R_{EQ}$.

**5–27** In Fig. 5–20, re-solve for $R_{EQ}$ if $R_2$ is removed from the circuit.

**5–28** In Fig. 5–21, solve for $R_{EQ}$.

**5–29** In Fig. 5–21, re-solve for $R_{EQ}$ if $V_A$ is reduced to 51 V.

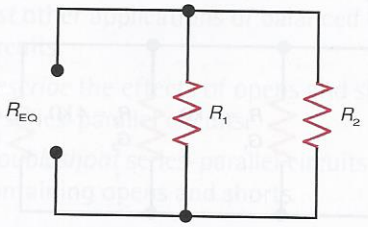
**5–30** In Fig. 5–22, solve for $R_{EQ}$.

**5–31** In Fig. 5–23, solve for $R_{EQ}$.

**5–32** In Fig. 5–24, solve for $R_{EQ}$.

**5–33** MultiSim In Fig. 5–25, how much is $R_{EQ}$ if $R_1$ = 100 Ω and $R_2$ = 25 Ω?

**Figure 5–25**




**5–34** MultiSim In Fig. 5–25, how much is $R_{EQ}$ if $R_1$ = 1.5 MΩ and $R_2$ = 1 MΩ?

**5–35** MultiSim In Fig. 5–25, how much is $R_{EQ}$ if $R_1$ = 2.2 kΩ and $R_2$ = 220 Ω?

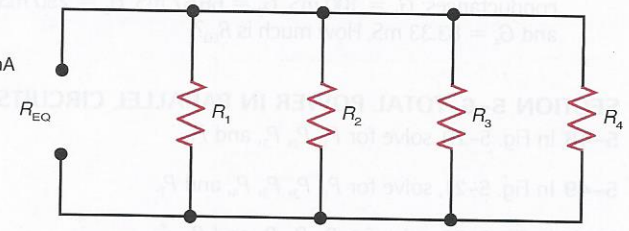
**5–36** In Fig. 5–25, how much is $R_{EQ}$ if $R_1$ = $R_2$ = 10 kΩ?

**5–37** In Fig. 5–25, how much resistance, $R_2$, must be connected in parallel with a 750 Ω $R_1$ to obtain an $R_{EQ}$ of 500 Ω?

**5–38** In Fig. 5–25, how much resistance, $R_1$, must be connected in parallel with a 6.8 kΩ $R_2$ to obtain an $R_{EQ}$ of 1.02 kΩ?

**5–39** How much is $R_{EQ}$ in Fig. 5–26 if $R_1$ = 1 kΩ, $R_2$ = 4 kΩ, $R_3$ = 200 Ω, and $R_4$ = 240 Ω?

**Figure 5–26**




**5–40** How much is $R_{EQ}$ in Fig. 5–26 if $R_1$ = 5.6 kΩ, $R_2$ = 4.7 kΩ, $R_3$ = 8.2 kΩ, and $R_4$ = 2.7 kΩ?

**5–41** MultiSim How much is $R_{EQ}$ in Fig. 5–26 if $R_1$ = 1.5 kΩ, $R_2$ = 1 kΩ, $R_3$ = 1.8 kΩ, and $R_4$ = 150 Ω?