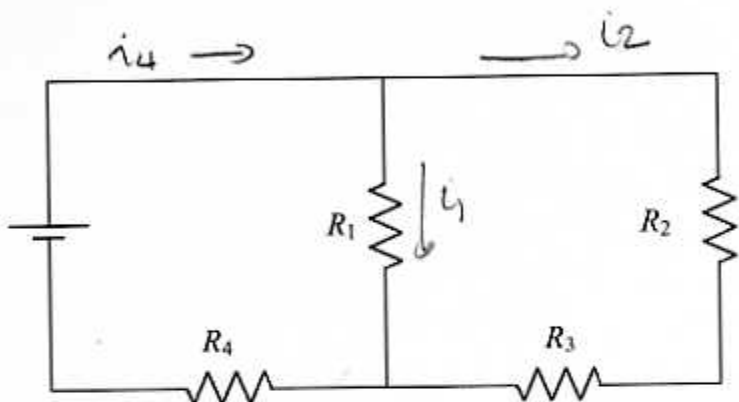


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Tuesday, October 6

Quiz 6A

The circuit below has four identical 10-Ω resistors and a 20-V battery.



a. Determine the current through R_2 .

$$R_{2-3} = 20 \Omega$$

$$R_{1-2-3} = \frac{1}{\frac{1}{10} + \frac{1}{20}} = \frac{20}{3} \Omega$$

$$R_{\text{all}} = 10 + \frac{20}{3} = \frac{50}{3} \Omega \quad \rightarrow \quad i_4 = \frac{20V}{\frac{50}{3}\Omega} = 1.2A$$

Because $R_1 = \frac{1}{2} R_{2-3}$, $\frac{1}{3}$ of i_4 go through R_{2-3}

$$i_{2-3} = i_2 = \frac{1.2A}{3} = \boxed{0.4A}$$

b. Determine the power dissipated in R_4 .

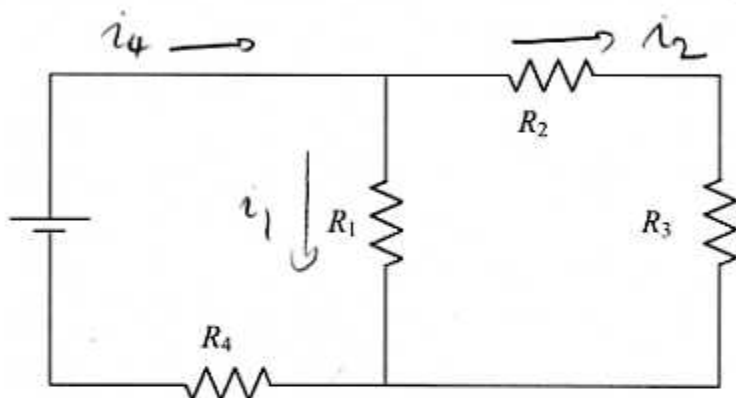
$$P = i_4^2 R_4 = (1.2A)^2 (10\Omega) = \boxed{14.4W}$$

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Quiz 6B

The circuit below has four identical 20- Ω resistors and a 20-V battery.



- a. Determine the current through R_2 .

$$R_{2-3} = 40\Omega \quad R_{1-2-3} = \frac{1}{\frac{1}{20} + \frac{1}{40}} = \frac{40}{3}\Omega$$
$$R_{\text{all}} = 20 + \frac{40}{3} = \frac{100}{3}\Omega \quad \Rightarrow \quad i_4 = \frac{20\text{V}}{\frac{100}{3}\Omega} = 0.6\text{A}$$

Since $R_1 = \frac{1}{2}R_{2-3}$, $\frac{1}{3}$ of i_4 go through R_{2-3}

$$i_{2-3} = i_2 = \frac{1}{3}(0.6\text{A}) = \boxed{0.2\text{A}}$$

- b. Determine the power dissipated in R_4 .

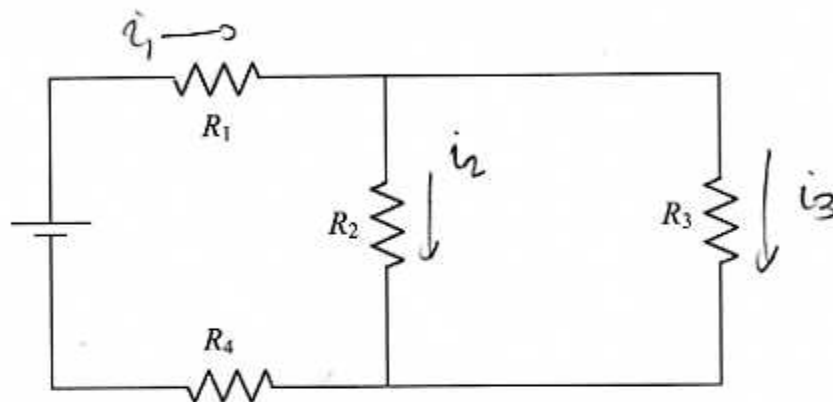
$$P_4 = i_4^2 R_4 = (0.6\text{A})^2 (20\Omega) = \boxed{7.2\text{W}}$$

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Quiz 6C

The circuit below has four identical $10\text{-}\Omega$ resistors and a 20-V battery.



- a. Determine the current through R_2 .

$$R_{2-3} = \frac{1}{\frac{1}{10} + \frac{1}{10}} = 5\Omega \quad R_{\text{all}} = 10 + 5 + 10 = 25\Omega$$

$$i_1 = \frac{20\text{V}}{25\Omega} = 0.8\text{A}$$

Half of that goes through R_2 : $i_2 = 0.4\text{A}$

- b. Determine the power dissipated in R_4 .

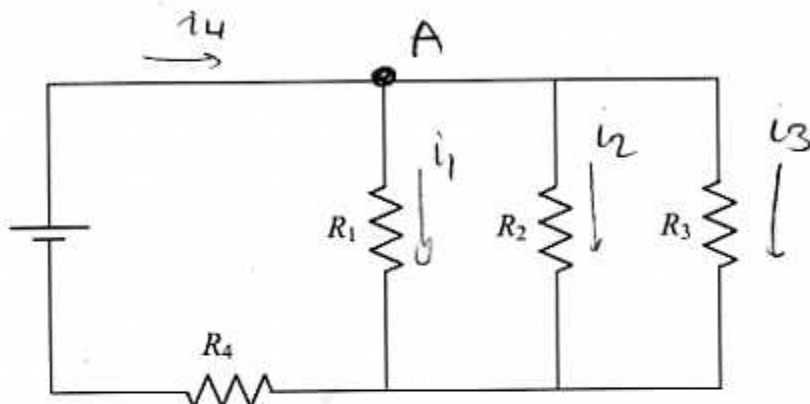
$$P_4 = R_4 i_1^2 = (10\Omega)(0.8\text{A})^2 = 6.4\text{W}$$

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Quiz 6D

The circuit below has four identical $12\text{-}\Omega$ resistors and a 20-V battery.



- a. Determine the current through R_2 .

$$R_{1-2-3} = \frac{1}{\frac{1}{12} + \frac{1}{12} + \frac{1}{12}} = 4\Omega$$

$$R_{\text{all}} = 12 + 4 = 16\Omega \rightarrow i_4 = \frac{20\text{V}}{16\Omega} = 1.25\text{A}$$

This current splits in 3 evenly at point A.

$$i_2 = \frac{1.25\text{A}}{3} = \boxed{0.42\text{A}}$$

- b. Determine the power dissipated in R_4 .

$$P_4 = R_4 i_4^2 = (12\Omega)(1.25\text{A})^2 = \boxed{19\text{W}}$$