Title	3rd homework in the Electric Circuit Theory class by 201923250

Author	201923250	Date	3.20.2021

Summarization chapters from 2.1 to 2.4

Ohm's rule states that the voltage v over a resistor is equal to the current from which the resistor flows. The resistance R of an element refers to its power, measured in ohms, to resist the electrical flow of the current.

A short circuit is a circuit feature that comes near to zero in resistance. An open circuit is a circuit of infinity resistance.

A single element like a voltage source or a resistor is a branch. A node is the point where two or more branches are related. There's a loop in a circuit that's closed. If they only share one node and hence have the same current, two or three of them would be in sequence. When they are attached to the same two nodes and hence have the same voltage through them, there are two or more components in parallel.

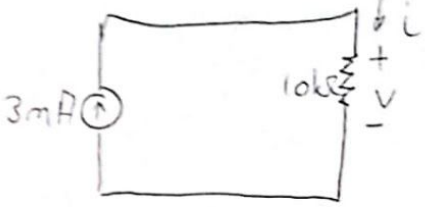
The current law (KCL) of Kirchhoff states that the algebraic number of currents entering a node is zero. The sum of the node entry currents is the same as the sum of the node outgoing currents.

Practice Problem Solutions from chapters 2.1 to 2.4

Practice problem 2.1

$V = iR \qquad i = \frac{V}{R} \qquad i = \frac{V}{R} \qquad i = \frac{110}{15} = 7.33\ A$

Practice problem 2.2



$V = iR = (3 \times 10^{-3})(10 \times 10^{3})$

$= 30\ V$

$G = \frac{1}{R} = \frac{1}{10k\Omega} = 100\mu S$

$p = Vi = (30\ V)(3mA) = 90mW$

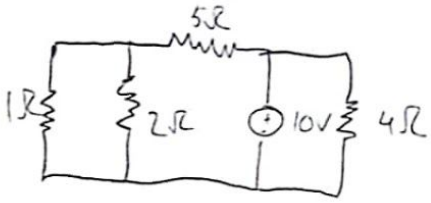
Practice problem 2.3

$p = 30\cos^2 t\ mW \qquad V = 15\cos t\ V \qquad p = vi \qquad i = \frac{p}{v} = \frac{30\cos^2 t\ mW}{15\cos t\ V} =$

$= 2\cos t\ mA$

$R = \frac{V}{i} = \frac{15\cos t\ V}{2\cos t\ mA} = 7.5k\Omega$

Practice problem 2.4



five branches, 3 nodes.

The 1Ω and 2Ω resistors are in parallel because both are connected to the same nodes 1 and 3.