FIFTH EDITION

Fundamentals of Electric Circuits

INSTRUCTOR SOLUTIONS MANUAL

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Chapter 1, Solution 1

(a) $q = 6.482 \times 10^{17} \times [-1.602 \times 10^{-19}\ C] =$ **–103.84 mC**

(b) $q = 1.24 \times 10^{18} \times [-1.602 \times 10^{-19}\ C] =$ **–198.65 mC**

(c) $q = 2.46 \times 10^{19} \times [-1.602 \times 10^{-19}\ C] =$ **–3.941 C**

(d) $q = 1.628 \times 10^{20} \times [-1.602 \times 10^{-19}\ C] =$ **–26.08 C**

Chapter 2, Solution 1. Design a problem, complete with a solution, to help students to better understand Ohm's Law. Use at least two resistors and one voltage source. Hint, you could use both resistors at once or one at a time, it is up to you. Be creative.

Although there is no correct way to work this problem, this is an example based on the same kind of problem asked in the third edition.

Problem

The voltage across a 5-kΩ resistor is 16 V. Find the current through the resistor.

Solution

$v = iR$ $\qquad$ $i = v/R = (16/5)\text{ mA} = \mathbf{3.2\ mA}$

Chapter 3, Solution 1

Using Fig. 3.50, design a problem to help other students to better understand nodal analysis.

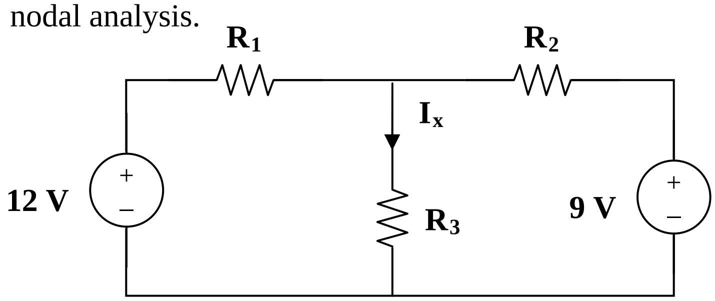


Figure 3.50
For Prob. 3.1 and Prob. 3.39.

Solution

Given R_1 = 4 kΩ, R_2 = 2 kΩ, and R_3 = 2 kΩ, determine the value of I_x using nodal analysis.

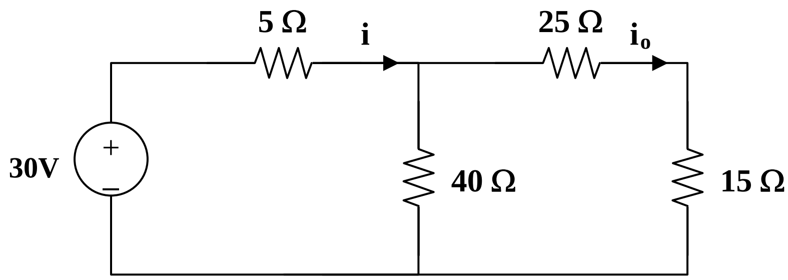
Let the node voltage in the top middle of the circuit be designated as V_x.

$[(V_x–12)/4k] + [(V_x–0)/2k] + [(V_x–9)/2k] = 0$ or (multiply this by 4 k)

$(1+2+2)V_x = 12+18 = 30$ or $V_x = 30/5 = 6$ volts and

$$I_x = 6/(2k) = \mathbf{3\ mA}.$$

Chapter 4, Solution 1.



$40 \| (25+15) = 20\Omega$, i = [30/(5+20)] = 1.2 and i_o = i20/40 = **600 mA**.

Since the resistance remains the same we get can use linearity to find the new value of the voltage source = (30/0.6)5 = **250 V**.

Chapter 5, Solution 1.

(a) R_{in} = **1.5 MΩ**

(b) R_{out} = **60 Ω**

(c) $A = 8x10^4$

Therefore $A_{dB} = 20 \log 8x10^4$ = **98.06 dB**