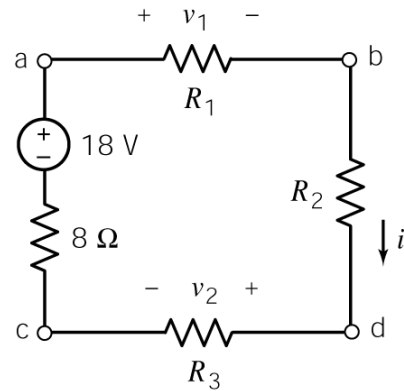
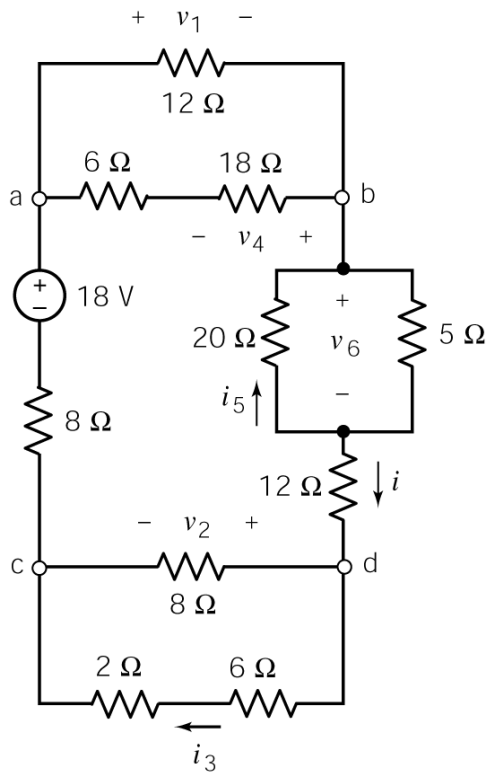
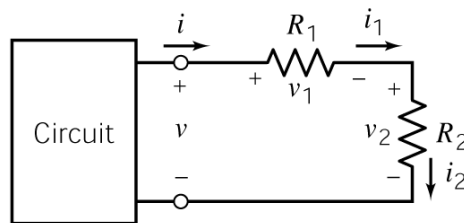


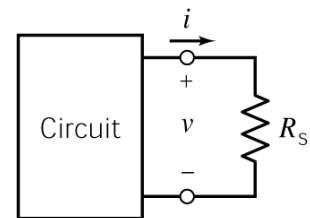
Example 3.6-3 Determine the values of i_3 , v_4 , i_5 and v_6 .



Series resistors:

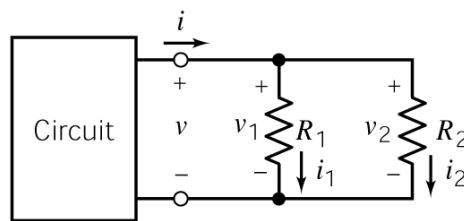


$$i = i_1 = i_2, v_1 = \frac{R_1}{R_1 + R_2} v, \text{ and } v_2 = \frac{R_2}{R_1 + R_2} v$$

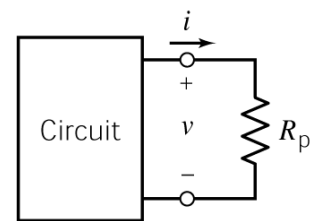


$$R_s = R_1 + R_2 \text{ and } v = R_s i$$

Parallel resistors:



$$v = v_1 = v_2, i_1 = \frac{R_2}{R_1 + R_2} i, \text{ and } i_2 = \frac{R_1}{R_1 + R_2} i$$

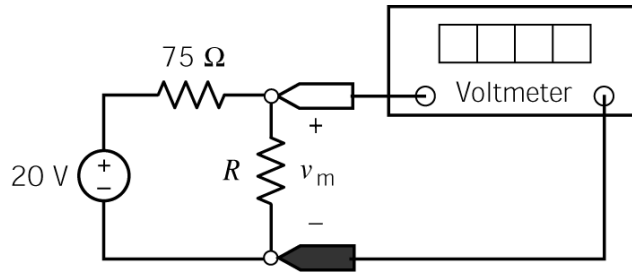


$$R_p = \frac{R_1 R_2}{R_1 + R_2} \text{ and } v = R_p i$$

Temperature Sensor

Example

Consider the voltage divider circuit



The resistor represents a temperature sensor. Suppose the resistance R , in Ω , is related to the temperature T , in $^{\circ}\text{C}$, by the equation

$$R = 50 + \frac{1}{2}T$$

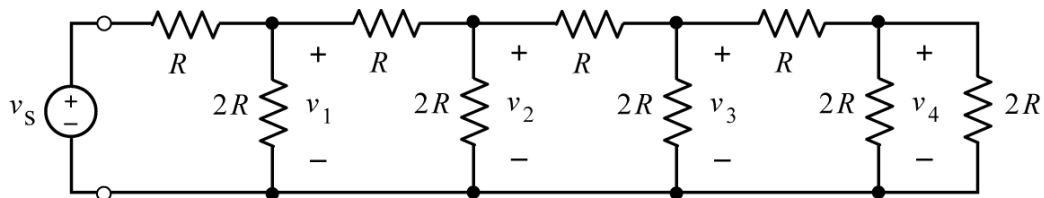
Suppose the temperature is expected to be in the range $0^{\circ}\text{C} \leq T \leq 100^{\circ}\text{C}$.

- a) Determine the meter voltage, v_m , corresponding to temperatures 0°C , 75°C and 100°C .
- b) Determine the temperature, T , corresponding to the meter voltages 8 V , 10 V and 15 V .

R-2R Ladder Networks

Example

Consider the R - $2R$ ladder network:



Show that

$$v_1 = \frac{1}{2^1}v_s = \frac{1}{2}v_s, \quad v_2 = \frac{1}{2^2}v_s = \frac{1}{4}v_s, \quad v_3 = \frac{1}{2^3}v_s = \frac{1}{8}v_s \quad \text{and} \quad v_4 = \frac{1}{2^4}v_s = \frac{1}{16}v_s$$