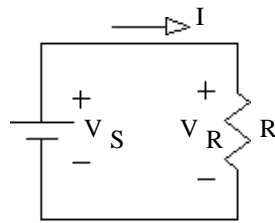a5

Note for ALL Homeworks: You may work them out on your own paper, but the grader would appreciate it if showed your work on the provided pdf or printout of the pdf. You **MUST Show your work to get credit. Circle answers.**

1. Ohm's law
   Consider the figure at right
   For each of the cases below,
   find the missing value.

a) $I := 0.01 \cdot A$ $V_R := 4 \cdot V$ $R = ?$

b) $I := 50 \cdot mA$ $R := 560 \cdot \Omega$ $V_R = ?$

c) $V_R := 12 \cdot V$ $R := 1.5 \cdot k\Omega$ $I = ?$

2. Power and Ohm's law.   Same circuit as above.   For each of the cases below, find the missing values.

a) $I := 5 \cdot mA$ $R := 2 \cdot k\Omega$ $V_R =$ $P_R =$

b) $V_R := 25 \cdot V$ $R := 100 \cdot \Omega$ $I =$ $P_R =$

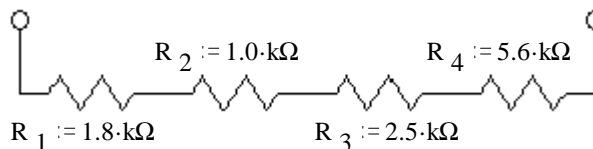c) $V_R := 20 \cdot V$ $I := 0.01 \cdot A$ $R =$ $P_R =$
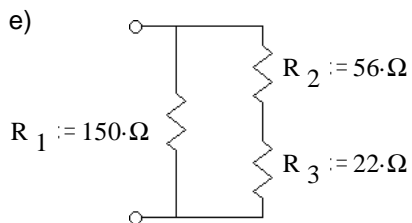
Ignore the fact that the following items run on AC
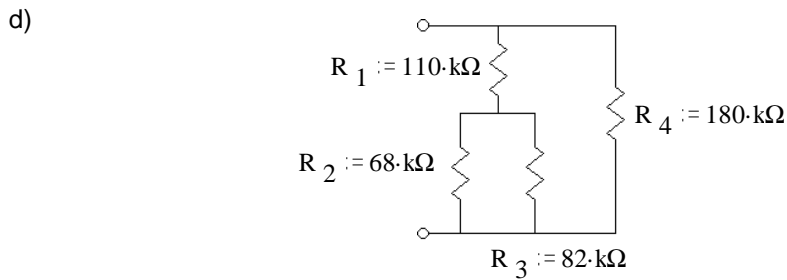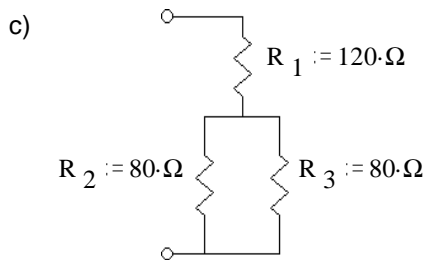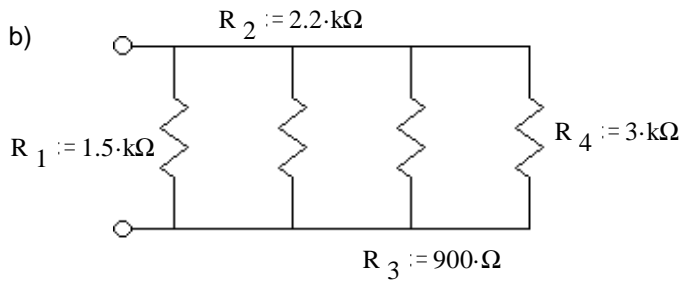
d) $P_R := 900 \cdot W$ $V_R := 120 \cdot V$ $I =$ $R =$
       Toaster

e) $P_R := 1500 \cdot W$ $R := 9.6 \cdot \Omega$ $I =$ $V_S =$
       Hair drier

f) $P_R := 2500 \cdot W$ $I := 10.5 \cdot A$ $R =$ $V_S =$
       Electric oven

3. Find the equivalent resistance   a)
   of each of these networks, i.e.
   what would an ohmmeter read
   if hooked to the terminals.

$R_2 := 1.0 \cdot k\Omega$ $R_4 := 5.6 \cdot k\Omega$
$R_1 := 1.8 \cdot k\Omega$ $R_3 := 2.5 \cdot k\Omega$

b)

$R_2 := 2.2 \cdot k\Omega$

$R_1 := 1.5 \cdot k\Omega$ $R_4 := 3 \cdot k\Omega$

$R_3 := 900 \cdot \Omega$

c)

$R_1 := 120 \cdot \Omega$

$R_2 := 80 \cdot \Omega$ $R_3 := 80 \cdot \Omega$

d)

$R_1 := 110 \cdot k\Omega$

$R_4 := 180 \cdot k\Omega$

$R_2 := 68 \cdot k\Omega$

$R_3 := 82 \cdot k\Omega$

e)

$R_2 := 56 \cdot \Omega$

$R_1 := 150 \cdot \Omega$

$R_3 := 22 \cdot \Omega$

4. Do as much as you can of homework DC3 now, otherwise you will find that homework to be a bit long.

Answers

1. a) $R := 400 \cdot \Omega$
    b) $V_R := 28 \cdot V$
    c) $I := 8 \cdot mA$

2. a) $V_R := 10 \cdot V$ $P_R := 50 \cdot mW$
    b) $I := 0.25 \cdot A$ $P_R := 6.25 \cdot W$
    c) $R := 2.0 \cdot k\Omega$ $P_R := 200 \cdot mW$

    d) $I := 7.5 \cdot A$ $R := 16 \cdot \Omega$
    e) $I := 12.5 \cdot A$ $V_S := 120 \cdot V$
    f) $R := 22.7 \cdot \Omega$ $V_S := 238 \cdot V$

3. a) $R_{eq} := 10.9 \cdot k\Omega$
    b) $R_{eq} := 390 \cdot \Omega$
    c) $R_{eq} := 160 \cdot \Omega$

    d) $R_{eq} := 81 \cdot k\Omega$
    e) $R_{eq} := 51.3 \cdot \Omega$