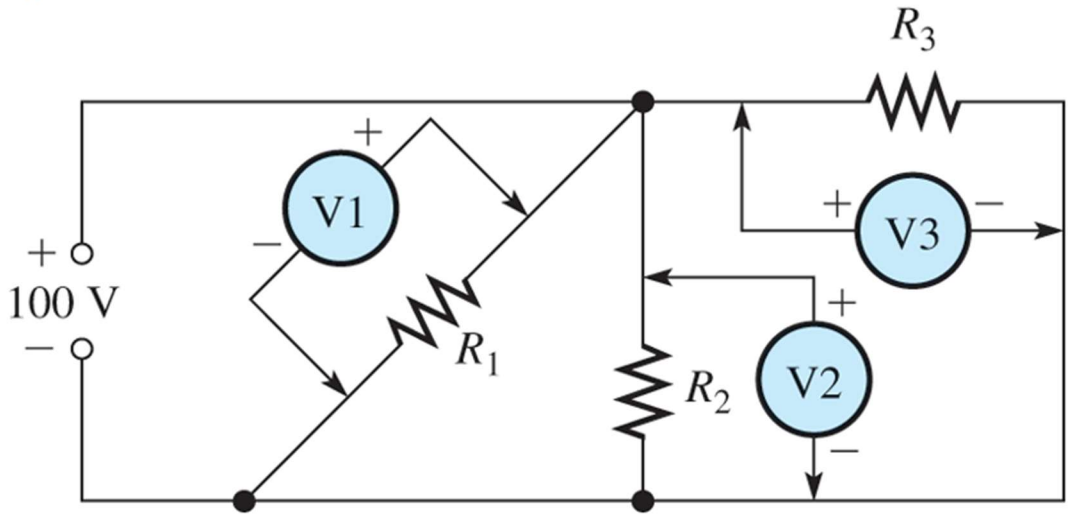
EET/CPE 1140 - Homework # 6

Chapter 6

5. The source voltage in **Figure 6–63** is 100 V. How much voltage does each of the meters read?

Figure 6–63



Since R_1, R_2, and R_3 are in parallel. All volt meters should read approximately the same as the source voltage at 100V.

9. The following currents are measured in the same direction in a three-branch parallel circuit: 250 mA, 300 mA, and 800 mA. What is the value of the current into the junction of these three branches?

In parallel the source current and exit current should be the sum of the branches. So $I_1 + I_2 + I_3 = I_{source} = I_{exit\_wire}$

$I_1 + I_2 + I_3 = I_{source} = (250 + 300 + 800) = 1.350$ amps

17. Find the total resistance for each of the following groups of parallel resistors:

a. $560\ \Omega$ and $1,000\ \Omega$
b. $47\ \Omega$ and $56\ \Omega$
c. $1.5\ \text{k}\Omega,\ 2.2\ \text{k}\Omega,\ 10\ \text{k}\Omega$
d. $1.0\ \text{M}\Omega,\ 470\ \text{k}\Omega,\ 1.0\ \text{k}\Omega,\ 2.7\ \text{M}\Omega$

$R_{parallel} = 1/ \sum 1/R_{index}$

a) $R_{parallel} = 358.974\Omega$
b) $R_{parallel} = 25.553\Omega$
c) $R_{parallel} = 818.858\Omega$
d) $R_{parallel} = 996.514\Omega$

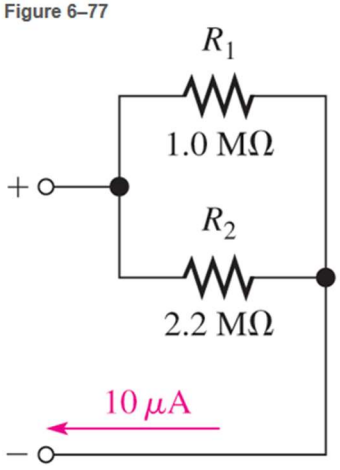
// related code

```
void parallel()
{
  double parallel_equavelent = 0.0,
        temp = 0.0;
  double set_of_resitors [] = {1000000.0,
                               470000.0,
                               1000.0,
                               2700000.0};

  for(int count = 0 ; count < 4; count++)
  {
    temp += 1/set_of_resitors[count];
  }
  parallel_equavelent = 1/temp;
  printf("\n\nThe parallel equavelent is: %.5lf\n\n",parallel_equavelent );
}
```

35. Determine the current in each branch of the current dividers of Figure 6–77.

Figure 6–77



(a)

$$I_{current\ branch} = \frac{R_{parallel\ equavelent}}{R_{Target}} * I_{source\ current}$$

$R_{\text{parallel equivalent}}$ = 687500Ω

$I_1 = \frac{687500\Omega}{10^6\Omega} * 10^{-5} = 6.875\ \mu A$

$I_2 = \frac{687500\Omega}{2.2*10^6\Omega} * 10^{-5} = 3.125\ \mu A$

```
#include "function.h"

#include <stdio.h>


double set_of_resitors [] = {1000000.0,
                             2200000.0};


double parallel()

{
  double parallel_equavelent = 0.0,
         temp = 0.0;



  for(int count = 0 ; count < 2; count++)
```

```
 {
   temp += 1/set_of_resitors[count];
 }
 parallel_equavelent = 1/temp;
   printf("\n\nThe parallel equavelent is: %.5lf\n\n",parallel_equavelent );
 return parallel_equavelent;
}

void current_divder()
{
 double parallel_equavelent = parallel(),
        source_current = 1/100000.0,
        resistor_ratio = 0.0,
        branch_current = 0.0;



        for(int count = 0; count < 2; count++)
        {
          resistor_ratio = parallel_equavelent / set_of_resitors[count];
          branch_current = resistor_ratio * source_current ;


          printf("\n\nThe current of the resitor %.4lf is : %.9lf micro Amps\n\n", set_of_resitors[count],
branch_current*1000000);
        }
}
```

41. Determine the total power in each circuit of **Figure 6–77**. (just part a)

I assume it is each circuit element.

$I_1 = 6.875\ \mu A$

$I_2 = 3.125\ \mu A$

P=IV

V=IR

$P = I^2R$

$P_1 = 47.265\ \mu W$

$P_2 = 21.484\ \mu W$

```
#include "function.h"
#include <stdio.h>

double set_of_resitors [] = {1000000.0,
                             2200000.0};

double parallel()
{
  double parallel_equavelent = 0.0,
         temp = 0.0;


  for(int count = 0 ; count < 2; count++)
  {
    temp += 1/set_of_resitors[count];
  }
  parallel_equavelent = 1/temp;
    printf("\n\nThe parallel equavelent is: %.5lf\n\n",parallel_equavelent );
  return parallel_equavelent;
```

```
}


void current_divder()
{
  double parallel_equavelent = parallel(),
        source_current = 1/100000.0,
        resistor_ratio = 0.0,
        branch_current = 0.0,
        power = 0.0;



        for(int count = 0; count < 2; count++)
        {
          resistor_ratio = parallel_equavelent / set_of_resitors[count];
          branch_current = resistor_ratio * source_current ;
          power = set_of_resitors[count]* branch_current*branch_current;


          printf("\n\nThe current of the resitor %.4lf is : %.9lf micro Amps the power is %.8lf watts\n\n",
set_of_resitors[count], branch_current*1000000,power*1000000);
        }




}
```