

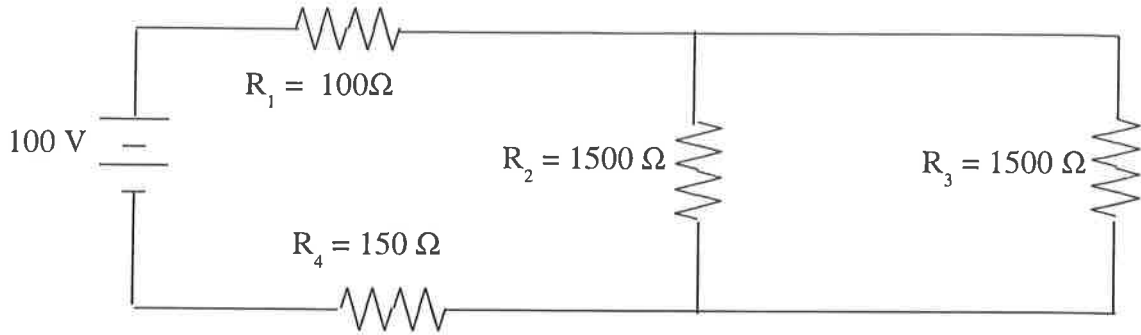
# Physics Combination Circuits Worksheet

KEY

## Section 1 – Complex Circuits (Networks)

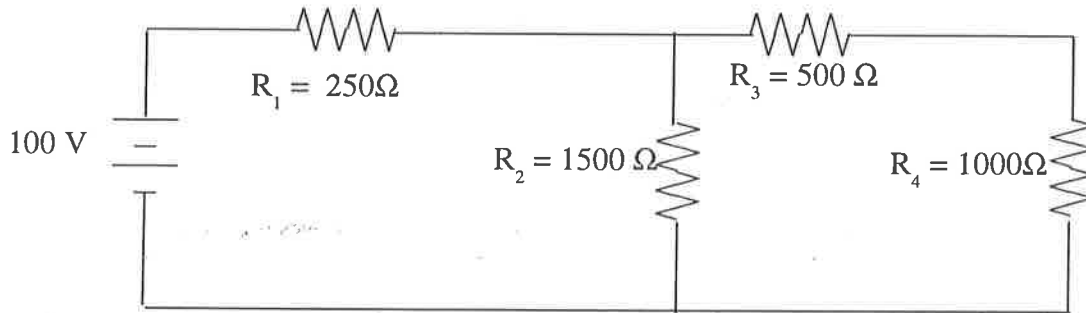
Find all values for the following circuits.

1.



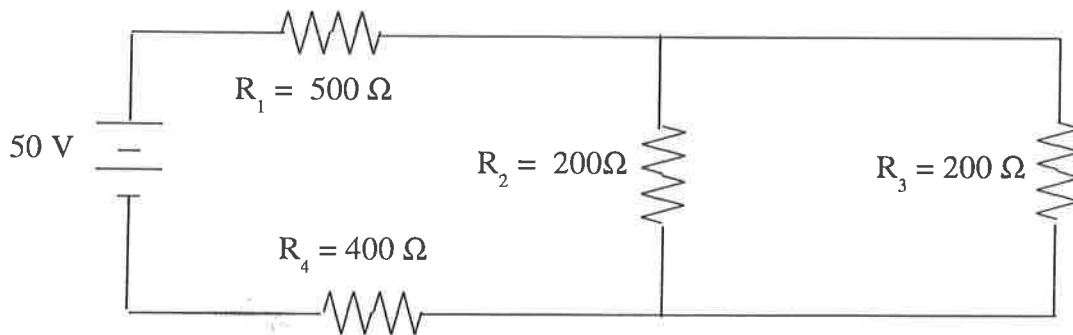
$V_T = \underline{100}$	$V_1 = \underline{10}$	$V_2 = \underline{75}$	$V_3 = \underline{75}$	$V_4 = \underline{15}$	$V_{23} = 75V$
$I_T = \underline{.1A}$	$I_1 = \underline{.1}$	$I_2 = \underline{.05}$	$I_3 = \underline{.05}$	$I_4 = \underline{.1}$	$I_{23} = .1A$
$R_T = \underline{1000}$	$R_1 = \underline{100}$	$R_2 = \underline{1500}$	$R_3 = \underline{1500}$	$R_4 = \underline{150}$	$R_{23} = 750\Omega$

2.



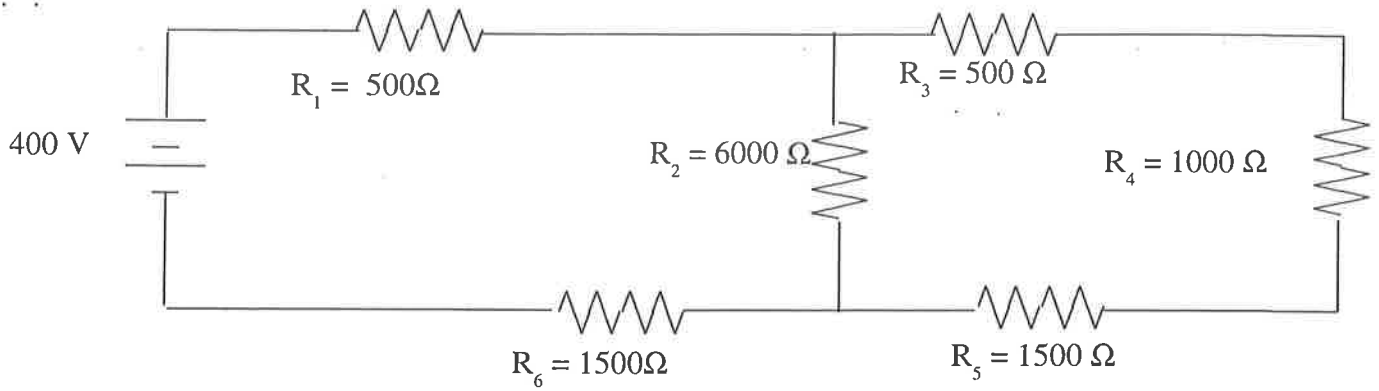
$V_T = \underline{100}$	$V_1 = \underline{25}$	$V_2 = \underline{75}$	$V_3 = \underline{25}$	$V_4 = \underline{50}$	$V_{34} = 75$	$V_{234} = 75$
$I_T = \underline{.1}$	$I_1 = \underline{.1}$	$I_2 = \underline{.05}$	$I_3 = \underline{.05}$	$I_4 = \underline{.05}$	$I_{34} = .05$	$I_{234} = .1$
$R_T = \underline{1000}$	$R_1 = \underline{250}$	$R_2 = \underline{1500}$	$R_3 = \underline{500}$	$R_4 = \underline{1000}$	$R_{34} = 1500$	$R_{234} = 750$

3.



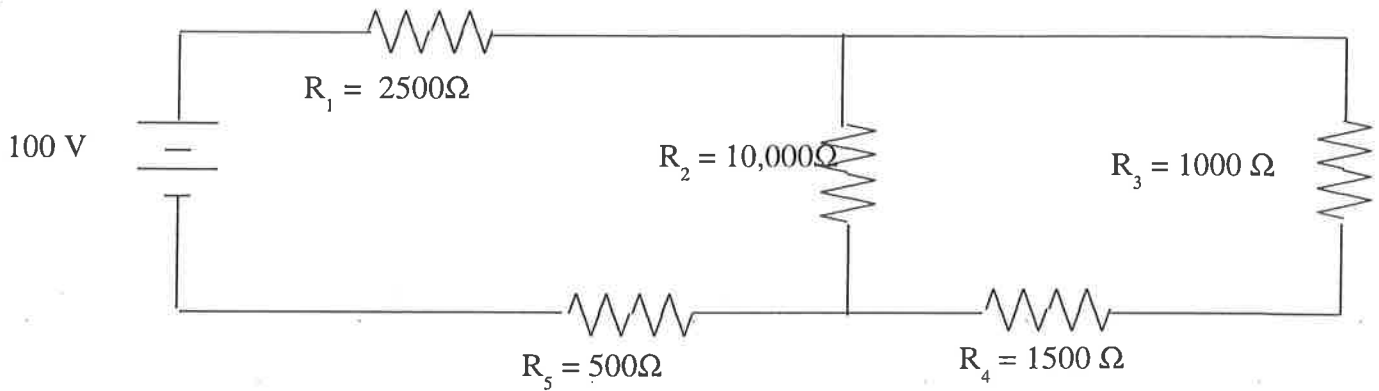
$V_T = \underline{50}$	$V_1 = \underline{25}$	$V_2 = \underline{5}$	$V_3 = \underline{5}$	$V_4 = \underline{20}$	$V_{23} = \underline{5}$
$I_T = \underline{.05}$	$I_1 = \underline{.05}$	$I_2 = \underline{.025}$	$I_3 = \underline{.025}$	$I_4 = \underline{.05}$	$I_{23} = \underline{.05}$
$R_T = \underline{1000}$	$R_1 = \underline{500}$	$R_2 = \underline{200}$	$R_3 = \underline{200}$	$R_4 = \underline{400}$	$R_{23} = \underline{100}$

4.



$V_T = 400$     $V_1 = 50$     $V_2 = 200$     $V_3 = 33.3$     $V_4 = 67$     $V_5 = 100.5$     $V_6 = 150$     $V_{345} = 200$     $V_{2345} = 200$   
 $I_T = .1$     $I_1 = .1$     $I_2 = .033$     $I_3 = .067$     $I_4 = .067$     $I_5 = .067$     $I_6 = .1$     $I_{345} = .067$     $I_{2345} = .1$   
 $R_T = 4000$     $R_1 = 500$     $R_2 = 6000$     $R_3 = 500$     $R_4 = 1000$     $R_5 = 1500$     $R_6 = 1500$     $R_{345} = 3000$     $R_{2345} = 2000$

5.



$V_T = \underline{\hspace{2cm}}$     $V_1 = \underline{\hspace{2cm}}$     $V_2 = \underline{\hspace{2cm}}$     $V_3 = \underline{\hspace{2cm}}$     $V_4 = \underline{\hspace{2cm}}$     $V_5 = \underline{\hspace{2cm}}$     $V_{34} = \underline{\hspace{2cm}}$     $V_{234} = \underline{\hspace{2cm}}$   
 $I_T = \underline{\hspace{2cm}}$     $I_1 = \underline{\hspace{2cm}}$     $I_2 = \underline{\hspace{2cm}}$     $I_3 = \underline{\hspace{2cm}}$     $I_4 = \underline{\hspace{2cm}}$     $I_5 = \underline{\hspace{2cm}}$     $I_{34} = \underline{\hspace{2cm}}$     $I_{234} = \underline{\hspace{2cm}}$   
 $R_T = \underline{\hspace{2cm}}$     $R_1 = \underline{\hspace{2cm}}$     $R_2 = \underline{\hspace{2cm}}$     $R_3 = \underline{\hspace{2cm}}$     $R_4 = \underline{\hspace{2cm}}$     $R_5 = \underline{\hspace{2cm}}$     $R_{34} = \underline{\hspace{2cm}}$     $R_{234} = \underline{\hspace{2cm}}$

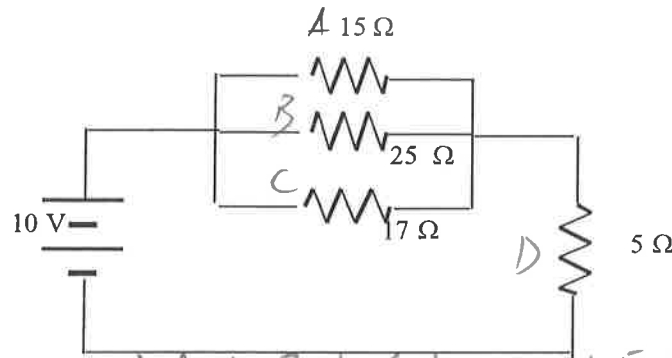
Complex circuit worksheet

*Solutions on back*

	$R_A$	$R_B$	$R_C$	$R_D$	$R_{ABC}$	$R_{TOTAL}$
V	5.5	5.5	5.5	4.55	5.5	10
I	.37	.22	.32	.91	.91	.91
R	15	25	17	5	6.04	11.04

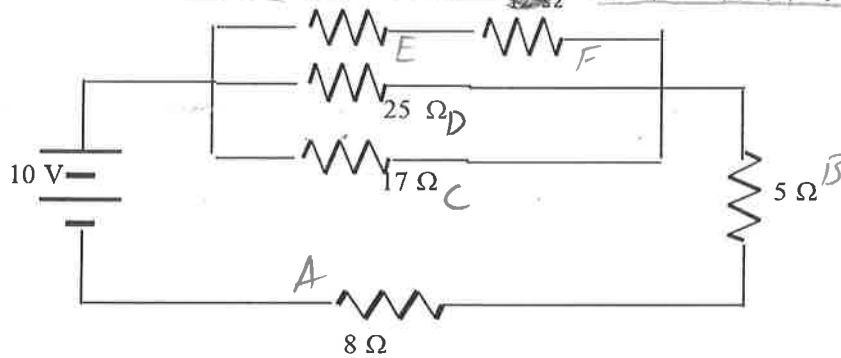
1) Determine the voltage and current in each resistor.

a)

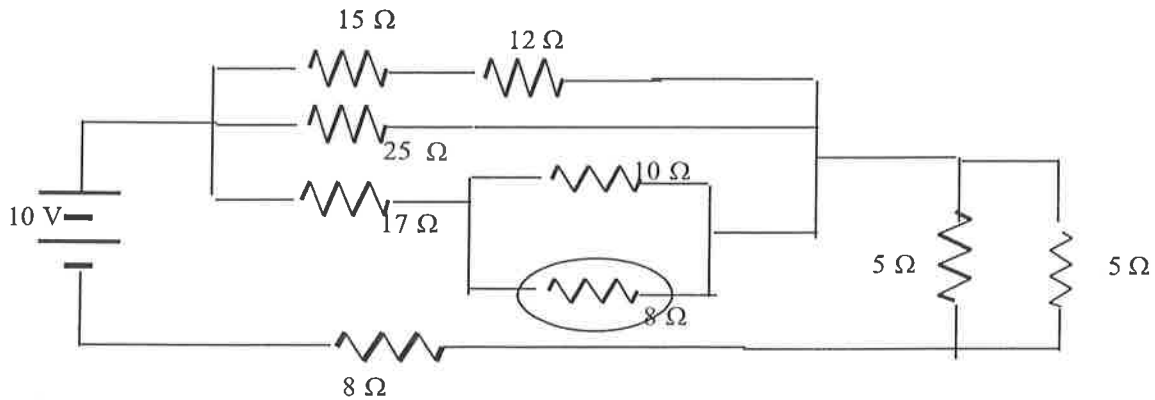


	A	B	C	D	E	F	EF	CDEF	Total
V	3.9	2.5	3.6	3.6	2	1.6	3.6	3.6	10
I	.49	.49	.21	.14	.13	.13	.13	.49	.49
R	8	5	17	25	15	12	27	7.4	20.4

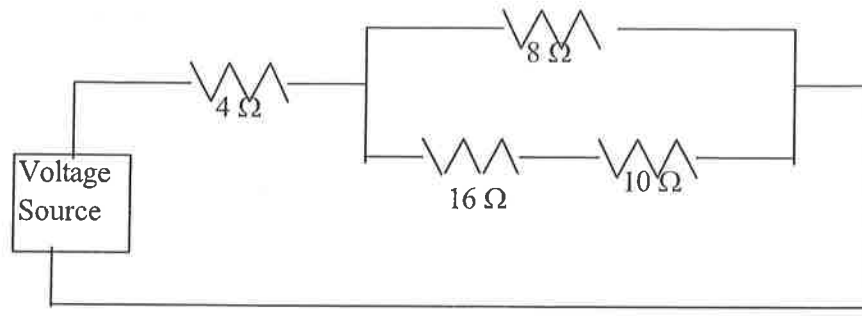
b)



2) Determine the power used in the circled resistor



- 3) The current flowing through the  $10\ \Omega$  resistor is  $0.5\ \text{A}$ . Using the circuit below, determine the current and voltage in the  $8\ \Omega$  and  $4\ \Omega$  resistor.



SOLUTIONS:

1) a)

$15\ \Omega$  :  $0.36\ \text{A}$ ,  $5.45\ \text{V}$   
 $25\ \Omega$  :  $0.218\ \text{A}$ ,  $5.45\ \text{V}$   
 $17\ \Omega$  :  $0.32\ \text{A}$ ,  $5.45\ \text{V}$   
 $5\ \Omega$  :  $0.9\ \text{A}$ ,  $4.5\ \text{V}$

b)  $17\ \Omega$  :  $3.7\ \text{V}$ ,  $0.2\ \text{A}$   
 $25\ \Omega$  :  $3.7\ \text{V}$ ,  $0.15\ \text{A}$   
 $15\ \Omega$  :  $2.1\ \text{V}$ ,  $0.14\ \text{A}$   
 $12\ \Omega$  :  $1.7\ \text{V}$ ,  $0.14\ \text{A}$   
 $5\ \Omega$  :  $0.5\ \text{A}$ ,  $2.5\ \text{V}$   
 $8\ \Omega$  :  $4\ \text{V}$ ,  $0.5\ \text{A}$

2)  $P=0.108\ \text{W}$  (rounding can have a big effect on your answer)

3)  $8\ \Omega$  :  $13\ \text{V}$ ,  $1.625\ \text{A}$   
 $4\ \Omega$  :  $8.5\ \text{V}$ ,  $2.125\ \text{A}$