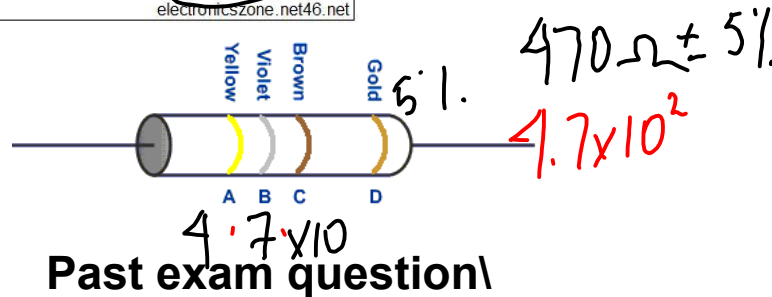
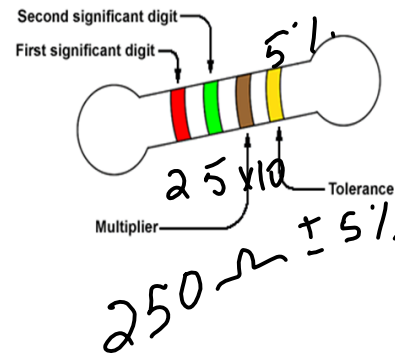
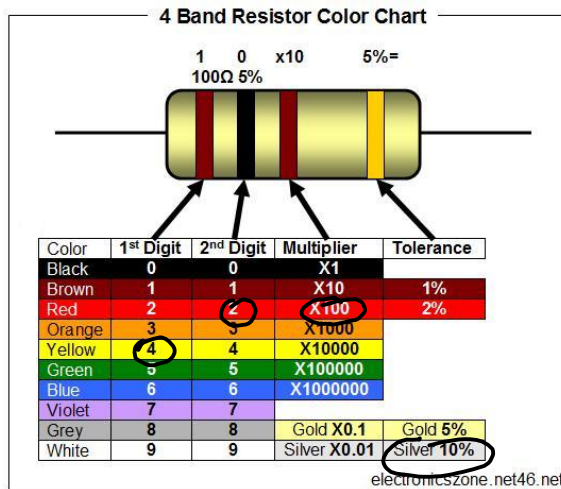


Coloured Resistors

Resistors may have various coloured strips around them. These colours give the strength of the resistor.

- 1st colour = 1st digit of the resistor value.
- 2nd colour = 2nd digit of the resistor value.
- 3rd colour = multiplier ($10^?$)
- 4th colour = tolerance (the amount the answer can be off by).

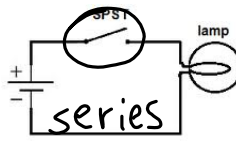
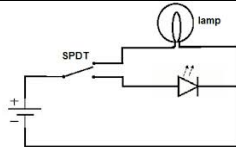
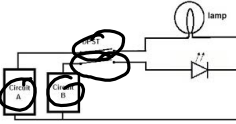
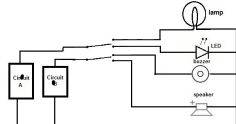


Past exam question\

1. The resistance of a resistor can be determined using the four coloured bands on the resistor as well as a colour code. What would the colours on the resistor be if the resistance of the resistor was $4200 \Omega \pm 10\%$?

- A) Silver, red, yellow, blue
- B) Silver, red, red, yellow
- C) Yellow, red, black, silver
- D) Yellow, red, red, silver

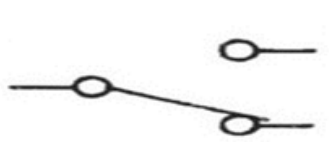
Various types of switches

Name	other terms	Power supply	Pathway for power supply	diagram
single pole single throw	unipolar unidirectional	1	1	
single pole double throw	unipolar bidirectional	1	2	
double pole single throw	bipolar unidirectional	2	1	
double pole double throw	bipolar bidirectional	2	2	

Pole and polar = *power supply* Throw and directional = *pathways for each power supply*

Past exam question

1. The circuit below represents a toy fire truck. This truck can either activate its lights or sound its siren, but cannot do both at the same time.



Which of the following identifies the type of switch that must be used?

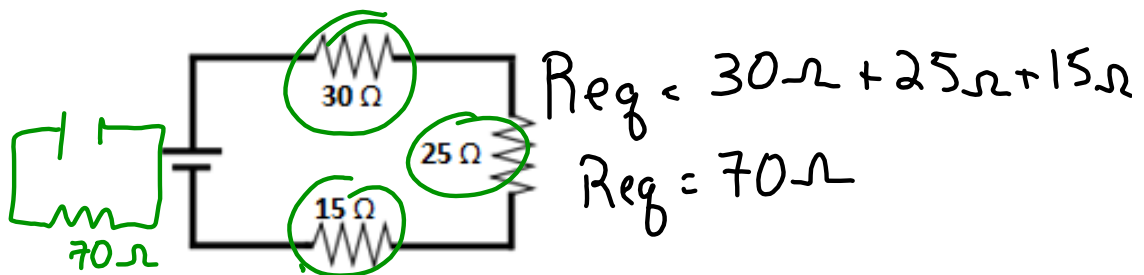
- A) Bipolar unidirectional
- B) Bipolar bidirectional
- C) Unipolar unidirectional
- D) Unipolar bidirectional**

Equivalent resistance

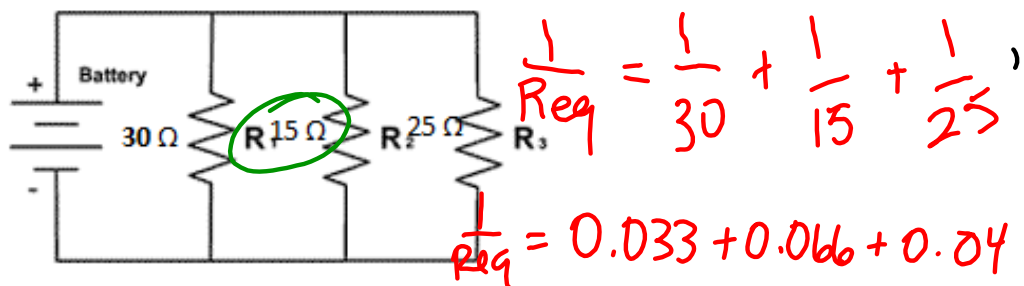
Def: Sum of all the resistors in a circuit. The current intensity of the circuit is maintained with the equivalent resistor.

symbol: R_{eq} or R_t

Series rule: $R_{eq} = R_1 + R_2 + R_3 \dots$



Parallel rule: $1/R_{eq} = 1/R_1 + 1/R_2 + 1/R_3$ $1/x$ or x^{-1}



has to be \downarrow the smallest resistor than

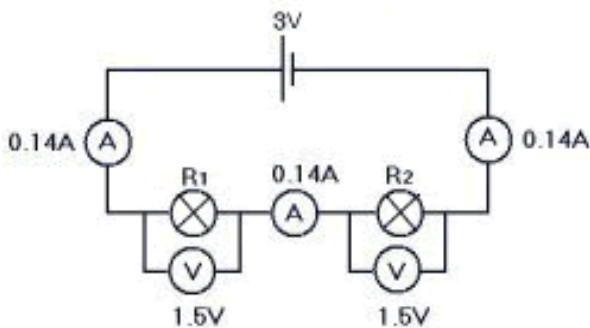
$\frac{1}{R_{eq}} = 0.139$
 $1 = \frac{0.139}{0.139} R_{eq}$
 $R_{eq} = 7.19\Omega$

Solving Circuits

1. Kirchoff's law

	Series	Parallel
current intensity	$I_1 = I_2 = I_3$	$I_s = I_1 + I_2$
potential difference	$V_s = V_1 + V_2$	$V_s = V_1 = V_2$
resistance	$R_{eq} = R_1 + R_2$	$1/R_{eq} = 1/R_1 + 1/R_2$

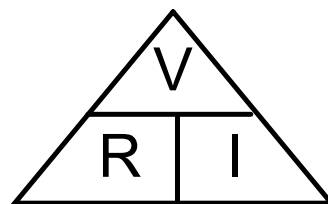
Series circuit



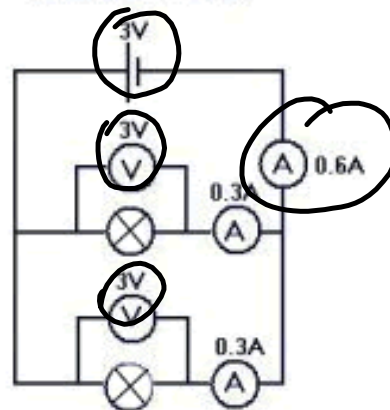
$V = 1.5 + 1.5 = 3V$
 $I = .14 = .14 = .14$

2. Ohm's Law

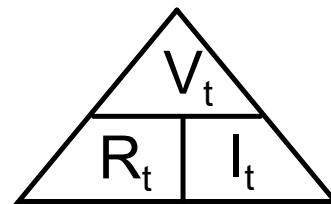
$R = V/I$



Parallel circuit



$I = .3 + .3 = .6$



Solving circuits

1. $I_t = \frac{V_t}{R_t}$ $V = R \times I$

	I	R	V
1	1.85A	30Ω	55.5V
2	1.85A	15Ω	27.75V
3	1.85A	20Ω	37V
T	1.85A	65Ω	120V

2. What is the current intensity coming from the power source?

Series

$I_t = \frac{V_t}{R_t} = \frac{12V}{6\Omega}$
 $R_t = 2 + 4 = 6$ $I_t = 2A$

3. What is the current coming from the power source?

$R_{eq} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$
 $\frac{1}{2} + \frac{1}{4} + \frac{1}{6} = \frac{3}{6} + \frac{1.5}{6} + \frac{1}{6} = \frac{5.5}{6}$
 $R_{eq} = \frac{6}{5.5} = 1.0909\Omega$
 $I_t = \frac{V}{R_{eq}} = \frac{12}{1.0909} = 11A$

4. What is the current intensity of resistor and the current intensity from the power source?

$R_{eq} = \frac{1}{\frac{1}{60} + \frac{1}{30} + \frac{1}{20}} = 10\Omega$
 $I_t = \frac{V}{R_{eq}} = \frac{12}{10} = 1.2A$

5. What is the resistance of resistor 2?

$V_1 = V_2 = V_3 = 3V$
 $R_2 = \frac{V}{I} = \frac{3V}{0.5A} = 6\Omega$

6. What is the resistance of resistor 2?

$I_1 = 1A$, $I_2 = 1.67A$, $I_3 = 6A$
 $R_2 = \frac{V}{I_2} = \frac{6V}{1.67A} = 3.59\Omega$

7. What is the current intensity of resistor 1?

$I_1 = 5A$, $I_2 = 2.5A$, $I_3 = 1.67A$
 $I_{total} = 9.17A$

8. What is the voltage of resistor 2?

$I_1 = 10A$, $I_2 = 5A$
 $V_2 = I_2 \times R_2 = 5A \times 20\Omega = 100V$

9. What is the total voltage?

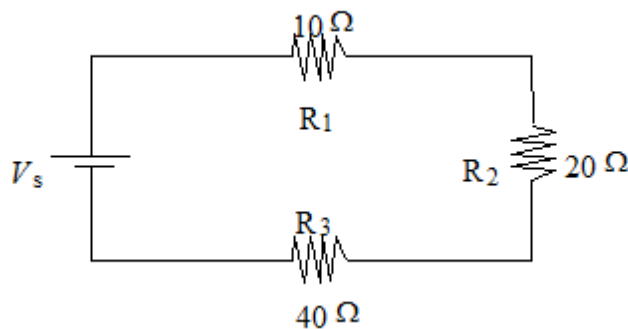
$V = I \times R_{eq}$
 $R_{eq} = \frac{1}{\frac{1}{5} + \frac{1}{30} + \frac{1}{10}} = 3\Omega$
 $V = 7A \times 3\Omega = 21V$

10. What is the resistance of resistor 1?

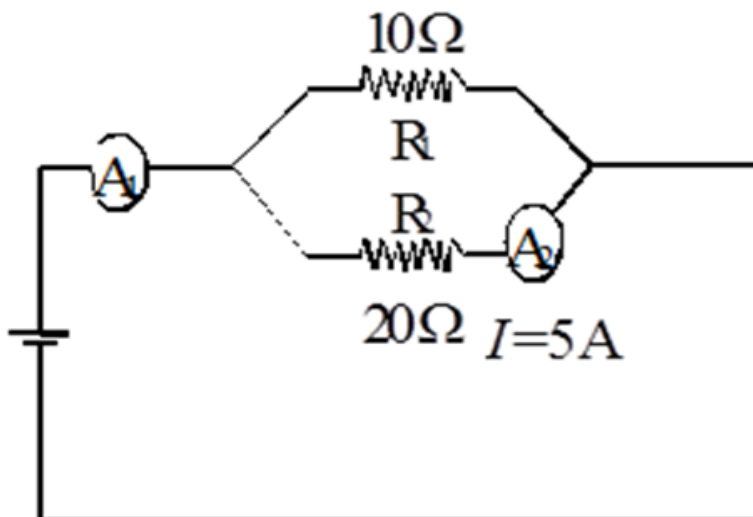
$I_1 = 7A$, $I_2 = 5.0A$
 $R_1 = \frac{V}{I_1} = \frac{1200V}{7A} = 171.4\Omega$

Past exam Questions

1. In the electric circuit illustrated below, the current intensity (I) is 0.25 A. What is the potential difference across the terminals of the power source, V_s ?



2. The following circuit consists of two resistors R_1 and R_2 , two ammeters A_1 and A_2 and a power supply



Ammeter A_2 reads 5 A. What is the reading given by ammeter A_1 ?

