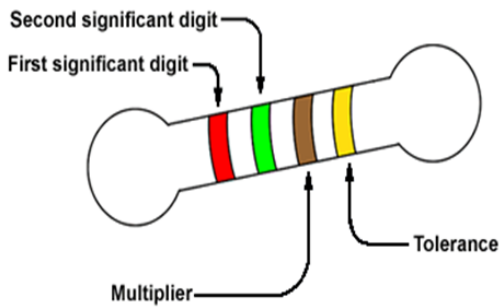


Coloured Resistors

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).



4 Band Resistor Color Chart

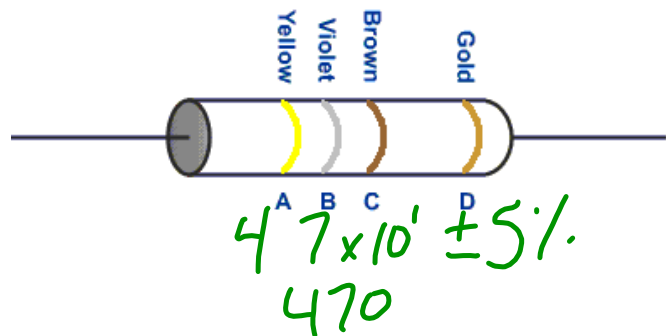
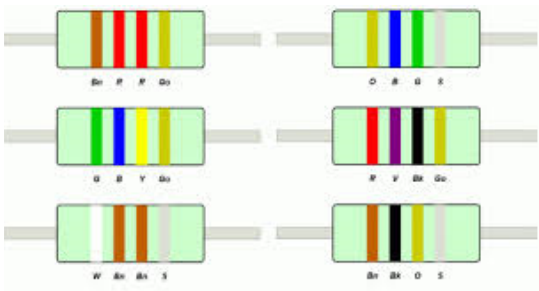
1 0 x10 5% =
100Ω 5%

Color	1 st Digit	2 nd Digit	Multiplier	Tolerance
Black	0	0	X1	
Brown	1	1	X10	1%
Red	2	2	X100	2%
Orange	3	3	X1000	
Yellow	4	4	X10000	
Green	5	5	X100000	
Blue	6	6	X1000000	
Violet	7	7		
Grey	8	8	Gold X0.1	Gold 5%
White	9	9	Silver X0.01	Silver 10%

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$32 \times 10^2 \pm 5\%$

Examples



Various types of switches

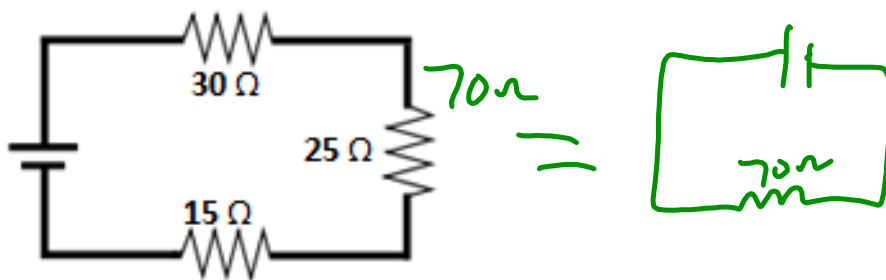
switch	other terms	# of possible paths	# of contacts that can be opened or closed (switches)	diagram
single pole single throw	unipolar unidirectional	1	1	
single pole double throw	unipolar bidirectional	2	1	
double pole single throw	bipolar unidirectional	1	2	
double pole double throw	bipolar bidirectional	2	2	

Equivalent resistance

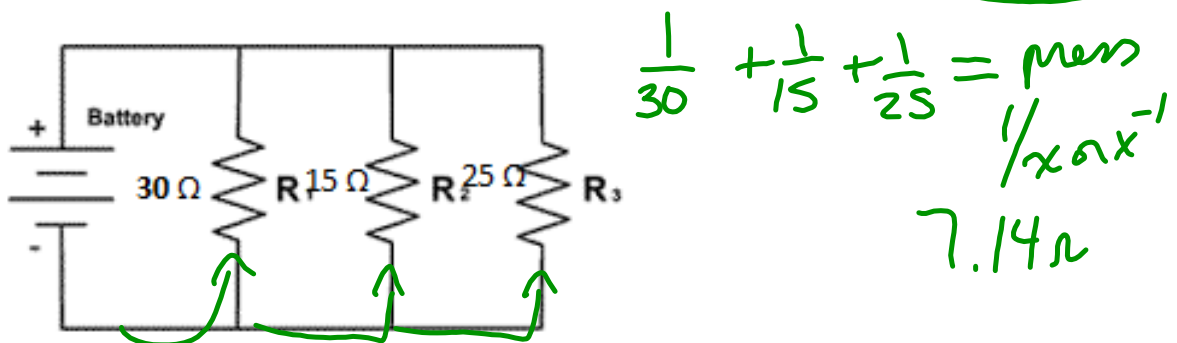
Def: Sum of all the resistors in a circuit. The current intensity of the circuit is maintained with the equivalent resistor.

symbol: R_{eq} or R_t

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



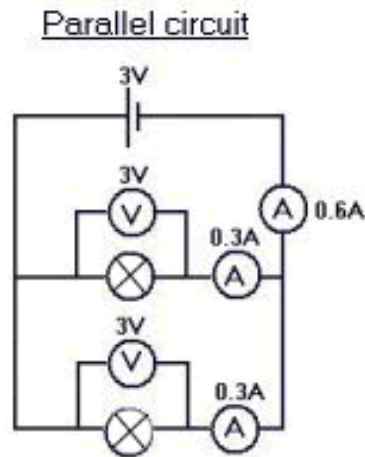
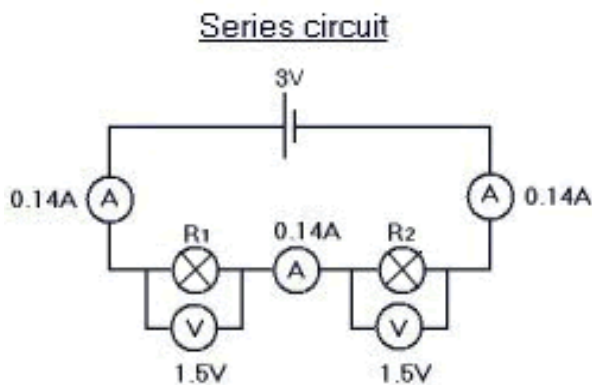
Parallel rule: $1/R_{eq} = 1/R_1 + 1/R_2 + 1/R_3$ $1/x$ or x^{-1}



Solving Circuits

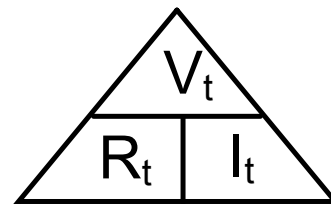
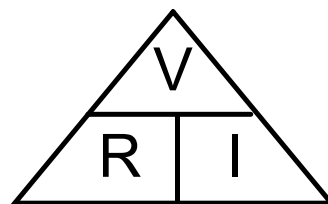
1. Kirchoff's law

	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	$R_{eq} = R_1 + R_2$	$1/R_{eq} = 1/R_1 + 1/R_2$



2. Ohm's Law

$$R = V/I$$



Solving circuits

1.

	I's	R's	V's
1	$\frac{120V}{30\Omega} = 1.9A$	30Ω	$57V$
2	$1.9A$	15Ω	$28.5V$
3	$1.9A$	20Ω	$38V$
T	$1.9A$	65Ω	$120V$

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

$I_T = \frac{V_T}{R_T} = \frac{12}{6} = 2A$

$R_1 + R_2 = 4 + 2 = 6\Omega$

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

$I_T = \frac{V_T}{R_T} = \frac{12}{1.3} = 9.2A$

$\frac{1}{2} + \frac{1}{4} = 1.2\Omega$

4. What is the current intensity of resistor 1 and 2?

$I = \frac{V}{R} = \frac{3}{60} = 0.05A$

$R_1 I = \frac{V}{R} = \frac{3}{30} = 0.1A$

5. What is the resistance of resistor 2?

$R = \frac{V}{I} = \frac{9}{45} = 0.2\Omega$

6. What is the resistance of resistor 3?

$R = \frac{V}{I} = \frac{6}{6} = 1\Omega$

$9 - 3 = 6A$

$V = R_1 I = 6 \times 1 = 6V$

7. What is the current intensity of resistor 1?

$I = \frac{V}{R} = \frac{6}{30} = 0.2A$

$6 - 1.7 - 2.5 = 1.8A$

8. What is the total voltage?

$V_T = R_T \times I_T = 1.58 \times 7 = 11.1V$

$\frac{1}{5} + \frac{1}{3} + \frac{1}{10} = 1.58\Omega$

9. What is the voltage of resistor 2?

$V = R \times I = 20 \times 5.5 = 110V$

$I = \frac{V}{R} = \frac{200 - 60 - 30}{20} = 5.5A$

10. What is the resistance of resistor 1

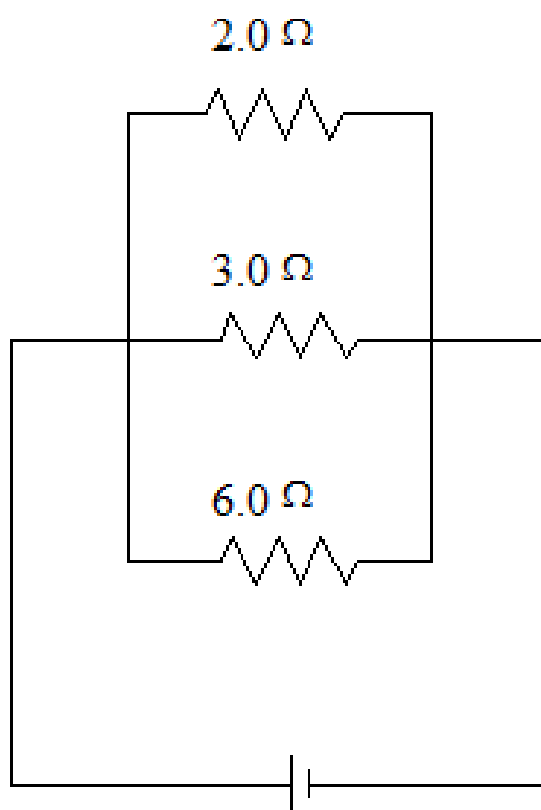
$R = \frac{V}{I} = \frac{1200}{70} = 17.1\Omega$

$V = R \times I = 70 \times 5 = 350V$

$1200 - 350 = 850V$

Past Exam questions

1. Three known resistances are connected in parallel to the terminals of a power source. The current passing through the $3.0\ \Omega$ resistance is $1.0\ \text{A}$.



What is the intensity of the current coming from the power source?

- A) $4.0\ \text{A}$ B) $3.5\ \text{A}$ C) $3.0\ \text{A}$ D) $2.5\ \text{A}$