Al Mustaqbal University College

STUDENT NAME:		
TUTOR NAME:	Dr. Ameer Al-khaykan	
PROGRAMME:	Electrical Circuit	
SUBJECT:	Electrical and Electronics	
COURSEWORK TITLE:	D.C Circuits Lab. Components	

Issue Date:	**Due Date:**	**Feedback Date:**	**Extension Date:**

PERFORMANCE CRITERIA:

TARGETED LEARNING OUTCOMES

4. Solve problems involving basic analogue and digital electronic circuits using numerical skills appropriate to an engineer;

5. Identify and safely use standard laboratory equipment to extract data, then apply in the solution of an electronic or electrical engineering problem;

6. Adopt a logical approach to the solution of engineering problems.

Important Information – Please Read Before Completing Your Work

All students should submit their work by the date specified using the procedures specified in the Student Handbook. An assessment that has been handed in after this deadline will be marked initially as if it had been handed in on time, but the Board of Examiners will normally apply a lateness penalty.

Your attention is drawn to the Section on Academic Misconduct in the Student's Handbook.

All work will be considered as individual unless collaboration is specifically requested, in which case this should be explicitly acknowledged by the student within their submitted material.

Any queries that you may have on the requirements of this assessment should be e-mailed to dr.ameer
No queries will be answered after respective submission dates.

You must ensure you retain a copy of your completed work prior to submission.

MARKING CRITERIA

COURSEWORK WILL BE MARKED ACCORDING TO THE FOLLOWING UNIVERSITY CRITERIA.

90-100%: a range of marks consistent with a first where the work is exceptional in all areas;

80-89%: a range of marks consistent with a first where the work is exceptional in most areas.

70-79%: a range of marks consistent with a first. Work which shows excellent content, organisation and presentation, reasoning and originality; evidence of independent reading and thinking and a clear and authoritative grasp of theoretical positions; ability to sustain an argument, to think analytically and/or critically and to synthesise material effectively.

60-69%: a range of marks consistent with an upper second. Well-organised and lucid coverage of the main points in an answer; intelligent interpretation and confident use of evidence, examples and references; clear evidence of critical judgement in selecting, ordering and analysing content; demonstrates some ability to synthesise material and to construct responses, which reveal insight and may offer some originality.

50-59%: a range of marks consistent with lower second; shows a grasp of the main issues and uses relevant materials in a generally business-like approach, restricted evidence of additional reading; possible unevenness in structure of answers and failure to understand the more subtle points: some critical analysis and a modest degree of insight should be present.

40-49%: a range of marks which is consistent with third class; demonstrates limited understanding with no enrichment of the basic course material presented in classes; superficial lines of argument and muddled presentation; little or no attempt to relate issues to a broader framework; lower end of the range equates to a minimum falls short in one or more areas.
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35-39%: achieves many of the learning outcomes required for a mark of 40% but falls short in one or more areas.

30-34%: a fail; may achieve some learning outcomes but falls short in most areas; shows considerable lack of understanding of basic course material and little evidence of research.

0-29%: a fail; basic factual errors of considerable magnitude showing little understanding of basic course material; falls substantially short of the learning outcomes for compensation.

Note:

- While constructing circuits all connects should be made with the power supply in the off position.
- Check power and ground connections (and other connections) **before** switch on the power.
- Make sure that the power and the ground are properly connected to all IC's before switch on the power.
- **DO NOT** strip wire ends longer than 1/4" and jam long bare ends into the breadboard holes. This will cause shorts and ruin the board.
- **DO NOT** short (connect) the power supply outputs together, i.e., do not allow the exposed wires to touch each other. This will cause permanent damage to the power supply.
- **DO NOT** connect the power supply to the breadboard with reverse polarity. This will cause the permanent chip damage.
- **DO NOT** connect an output of any gate to the output of another gate, to a switch, to power (+5V), or to ground. These situations will cause excessive currents and result in the permanent damage to the chip or chips involved.

Objectives:

This is the first laboratory where you will deal with such matters as the laboratory reports, safety issues, the resistance color codes, the breadboard, the Lab measurement equipment and simulation software.

Equipment and components required:

1. Circuit construction board (Breadboard).
2. D.C. Power Supply Units.
3. Digital Multimeter.
4. Various Resistors.
5. Wire for connections.

Power supply *:*

It’s a DC power supply used to generate constant voltage " CV "or constant current " CI " . In our lab we using these two DC supply models shown below to provide the circuit by voltage or current or both .

Fig. (a)

Fig. (b)

Figure 1 : (a & b) : DC supply models in our lab

1. ***Resistor*** :

It's manufactured to specific amount of resistance (force encountered for flow of charge happened as result of collision between charge & atom's).

The voltage – current relationship of an ideal resistor is given by

$$V = RI$$

where I is the current flowing through the resistor of resistance R when a voltage V is applied across its terminals. A resistor is conventionally drawn as shown in Figure 1. The unit of resistance is the Ohm (Ω).

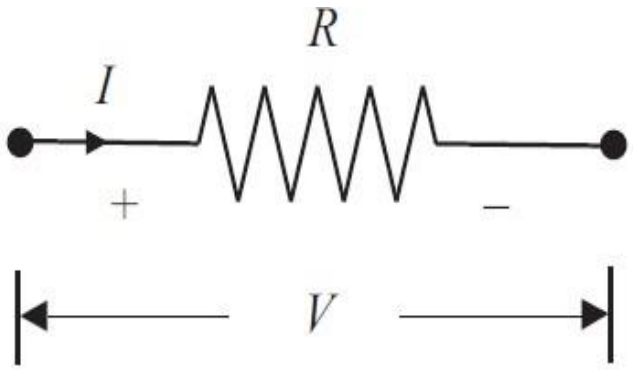


Figure 2: Schematic Representation of a Resistor

The most common resistor is made of carbon and manufactured as a cylinder with axial wire leads. Four colored bands painted around the cylinder body identify the resistance value and its tolerance. The international resistor color code is represented in Figure 3 and Table 1 where the resistance is given by

$$R = AB \times 10^{C} \pm D\%.$$

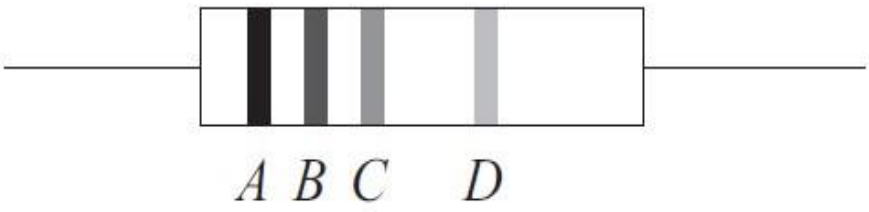
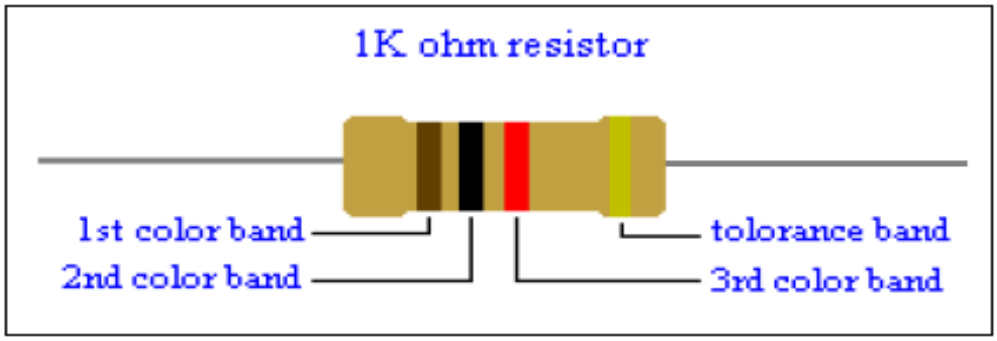


Figure 3 : Resistor Color Code



Band Color	1st Band #	2nd Band #	*3rd Band #	Multiplier x	Tolerances ± %
Black	0	0	0	1	
Brown	1	1	1	10	± 1%
Red	2	2	2	100	± 2 %
Orange	3	3	3	1000	
Yellow	4	4	4	10,000	
Green	5	5	5	100,000	± 0.5 %
Blue	6	6	6	1,000,000	± 0.25 %
Violet	7	7	7	10,000,000	± 0.10 %
Grey	8	8	8	100,000,000	± 0.05 %
White	9	9	9	1,000,000,000	
Gold				0.1	± 5%
Silver				0.01	± 10 %
None					±20 %

For example, if the color bands from left to right on a resistor are red, violet, orange, and gold, then the resistance is

$$R = \left(27 \times 10^3 \pm 5\%\right)\Omega$$
$$= \left(27,000 \pm 1,350\right)\Omega.$$

2. ***Digital Multi-meter*** *:*

A multi-meter is a devise used to measure voltage, resistance and current in electronics & electrical equipment.
It is also used to test continuity between to 2 points to verify if there is any breaks in circuit or line.

There are two types of multi-meter Analog & Digital :

1. *Analog has a needle style gauge.*
2. *Digital has a LCD display (**Referenced during our lab**)*

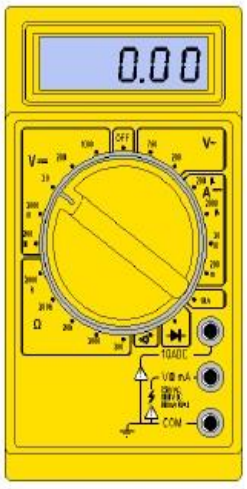
Meter leads

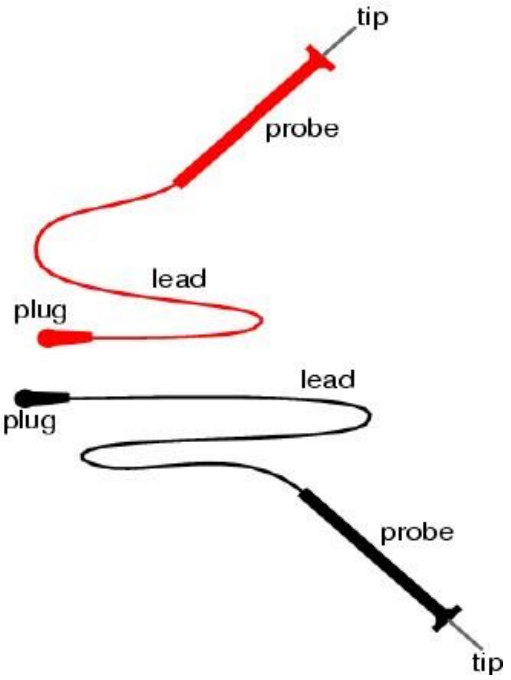
•Red meter lead
Is connected to Voltage/Resistance or amperage port
Is considered the positive connection

•Probes
Are the handles used to hold tip on the tested connection

•Tips
Are at the end of the probe and provides a connection point

•Black meter lead
Is always connected to the common port
Is considered the negative connection





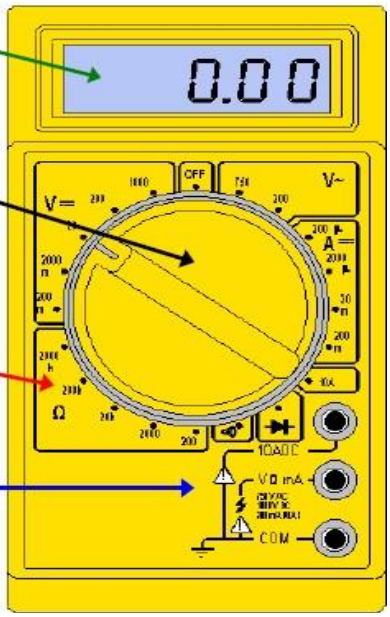
Display & Dial Settings

• **Digital Display**
Shows measured value.

• **Meter Dial**
Turn dial to change functions.
Turn dial to OFF position after use.

• **Panel Indicator**
Shows each function and setting range to turn dial to.

• **Probe Connections**
Specific for each function.



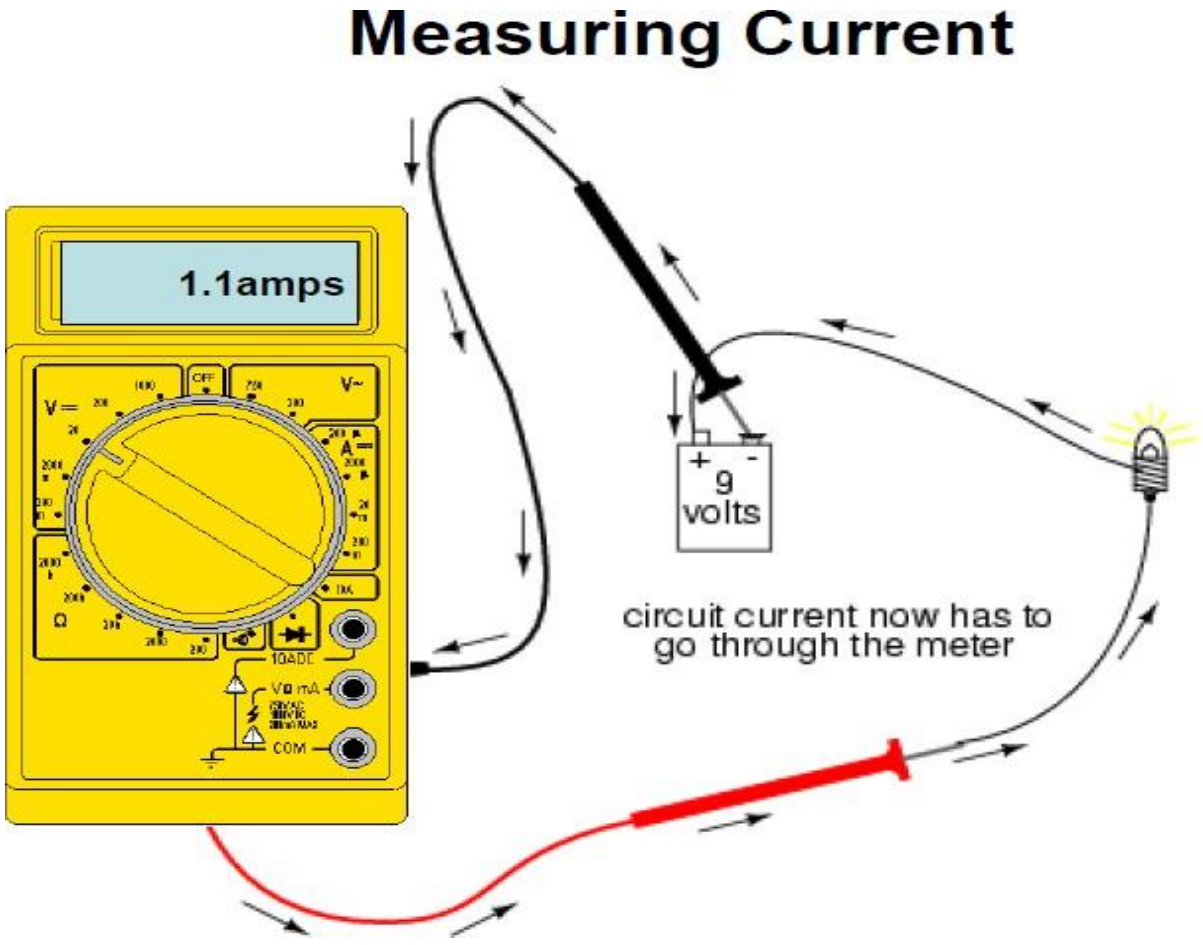
Common DMM Symbols

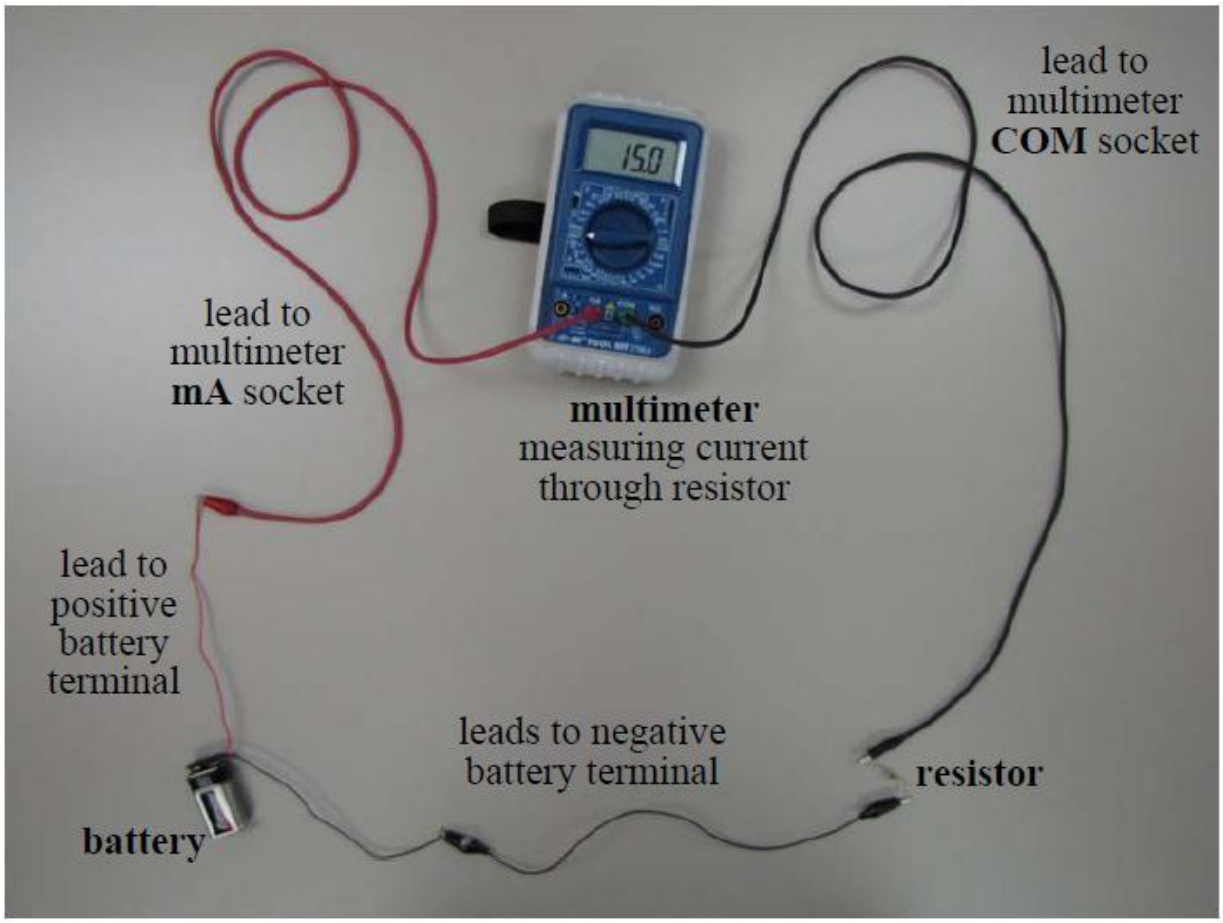
~	AC Voltage		Ground
⎓	DC Voltage	⊣(	Capacitor
Hz	Hertz	µF	MicroFarad
+	Positive	µ	Micro
—	Negative	m	Milli
Ω	Ohms	M	Mega
→|	Diode	K	Kilo
•)))	Audible Continuity	OL	Overload

These symbols are often found on multimeter and schematics.
They are designed to symbolize components and reference values.

The current *is the amount of charge flowing through a conductor per unit time, and is measured in amperes, A (1A = 1 coulomb/sec).*

The current, I, through a resistor R can be measured with an ammeter (multi-meter set to measure current) connected in series with the (resistor or load). Note that the same current flows in both the ammeter and the resistor. In typical use, the ammeter resistance is much smaller than the resistor resistance, so adding the ammeter to the circuit has little effect on the current.



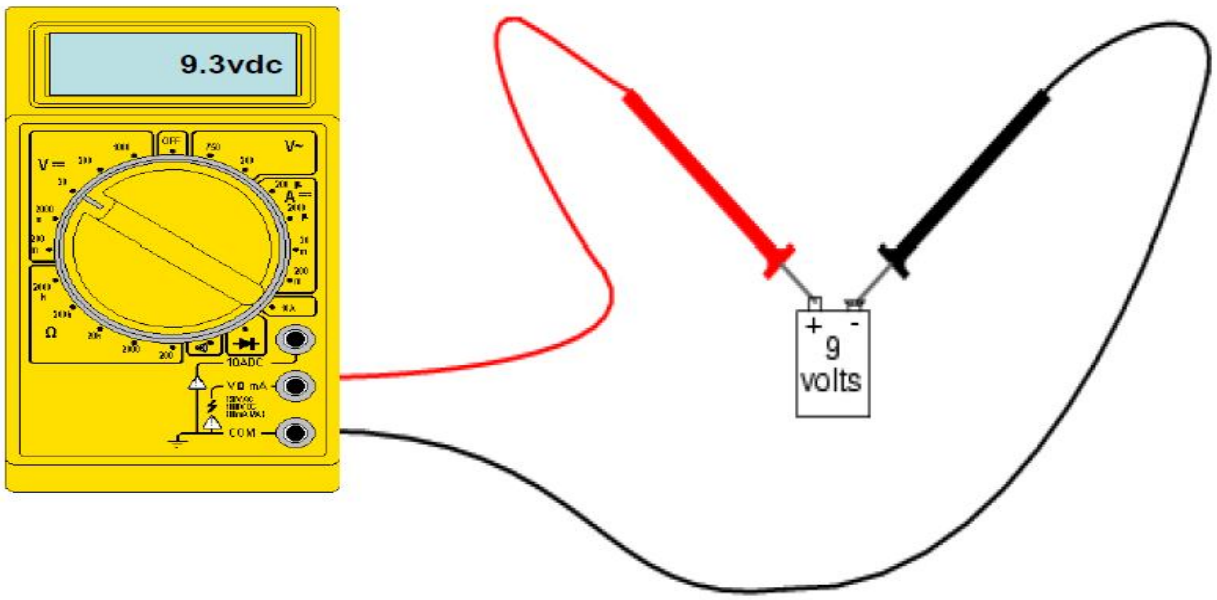


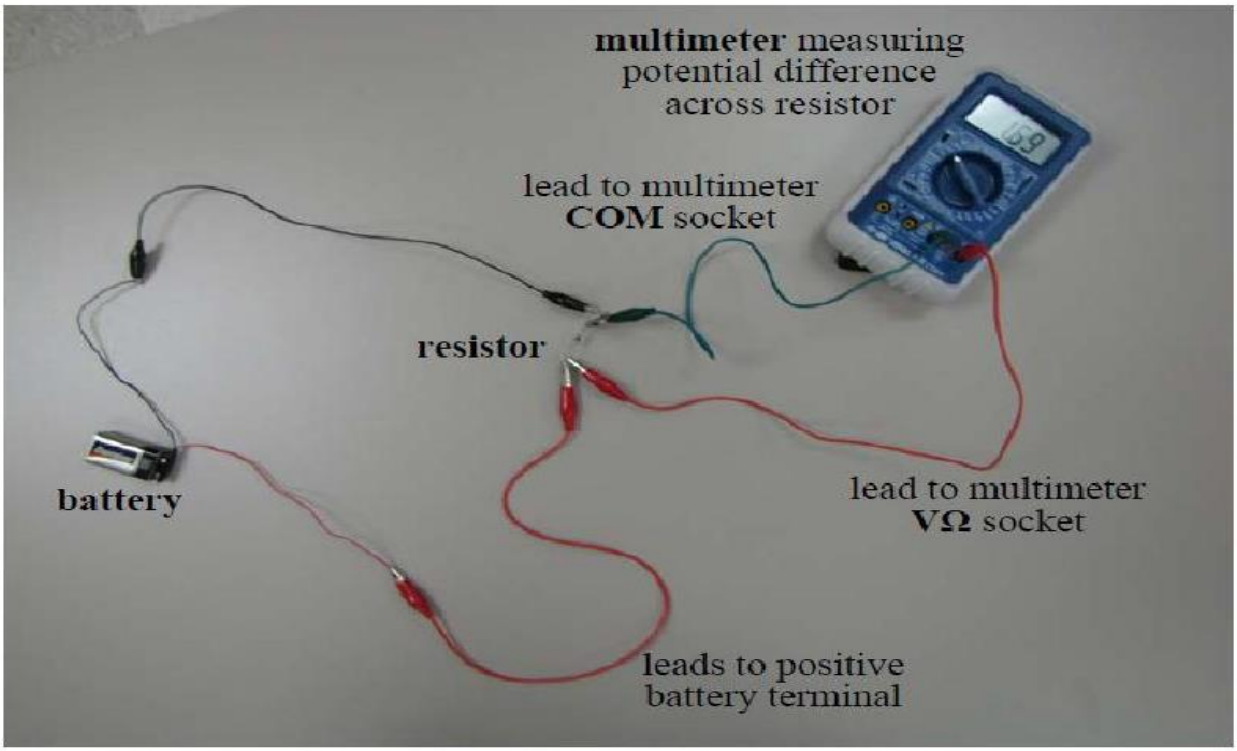
Circuit with Multimeter in Series with Resistor to Measure Current **through** the Resistor

<u>The potential difference (or voltage)</u> *is the energy liberated per unit charge flowing through the circuit. It is measured in volts, so that 1 volt*

= 1 joule/coulomb. The potential difference, V, between the ends of the resistor can be read on a voltmeter (multi-meter set to measure potential difference, V) connected in parallel with the (resistor or load
). Note that actually a small fraction of the current is diverted through the voltmeter, but for a good voltmeter this current should be negligible compared with the current, I, through the resistor.

Measuring Voltage





Circuit with Multimeter Measuring Potential Difference (Voltage) **across** the Resistor.

Discussion *:*

1. Determine the value and tolerance of the resistors shown in the following figure.

2. *Record resistor colors gave to its value in below :*

4.7 KΩ±5% , 910Ω ±10% , 12 Ω ±5%, 6.8KΩ ± 20%

3. *Enumerate the all types of Resistor.*