



Developing An Electrical Conductivity Meter

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Introduction:

A solution which carries an electric current is called an electrolyte. Chemical reactions take place as the current passes through solution. Electricity which flows as a motion of electrons forms energy. Heat produced which is a form of energy has a variety of effects on a wide range of solutions. The aim of this project is to develop a device which can test solutions which are good/poor electrical conductors in relation to safety or unsafe for various uses. An Electrical Conductivity meter (EC meter) developed can measure the electrical conductivity in a solution. Our main assumption is that solutions which are good conductors of electricity are dangerous for direct human use, or in various applications. Also, conductivity of a solution is highly temperature dependent. The conductivity of common electrolytes typically increases with increasing temperature.

Method:

In order to construct a device the following tools are needed

Wire, a blinking LED (Light emitting diode)
Switch, meter, PCB (Printed circuit board) soldering kit
Battery 6.0 volts, Beakers, Electrodes, resistor, Diode.

To test the conductivity the following sample liquids can be used.

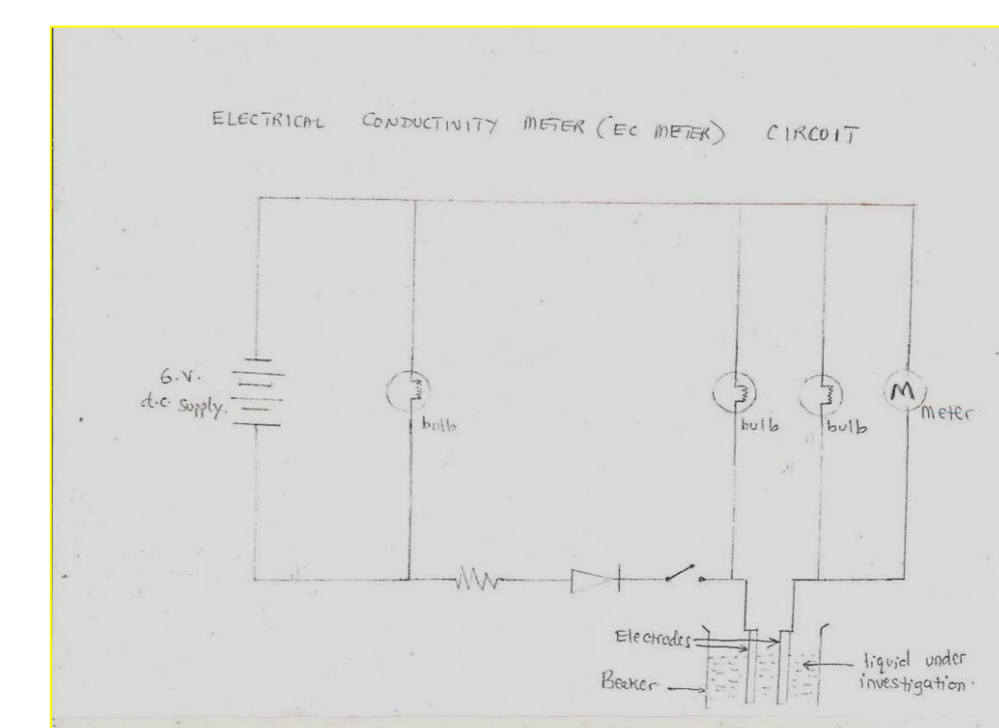
distilled water
sugar water
(sodium sulfate, Potassium chloride)
Hydrochloric acid, Sulphuric acid

Set the device according to the circuit prepared
Insert the electrodes into the sample solution
In any test when you connect the battery the LED will light to show presence of power, switch on indicate you allow for a device to test and the last LED when it lights indicate that the circuit is complete. The solution in test is an electrolyte.
When the test is complete wash electrodes with distilled water.

Results:

A device worked properly in the experiments and provided a desired outcome (testing electrical conductivity in solutions).
The table shows results on sample solutions tested

S/n	Substance	Conductivity
1	Distilled water	Very weak
2	Sugar water	None
3	Sodium Chloride Solution	Weak
4	Hydrochloric acid	Very Strong
5	Sulphuric acid	Very Strong



Conclusions:

Most liquids that conduct electricity are solutions of acids, bases and salts.
Therefore, solutions with low concentration of ions are weak conductors of electricity.
When further research is conducted to improve this electrical conductivity meter, it will be able to test soil, swimming pools, and fresh water systems to monitor the amount of nutrients, salts or impurities in water which are dangerous for our environment, agriculture and small food industries etc.

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Acknowledgements:

We are primarily conveying grateful thanks to our teacher without them we couldn't write properly our inventions.
We are indebted to Mr. Peter Makula the headmaster of Mwasele Secondary School who allowed us to do several experiments at his school.
The Principal VETA Shinyanga for allowing us to conduct a research project on electricity and electrical devices.

Further information:

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