

## **EXPERIMENT #2**

### **CONVERSION OF GALVANOMETER TO VOLTMETER**

#### **OBJECTIVE:**

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#### **GALVANOMETER:**

A galvanometer is a type of sensitive ammeter; an instrument for detecting small electric current. It is an analog electromechanical actuator that produces a rotary deflection of some type of pointer in response to electric current through its coil in a magnetic field.

#### **WORKING PRINCIPLE OF GALVANOMETER:**

Galvanometer works on the principle of conversion of electrical energy into mechanical energy.

#### **ESSENTIAL PARTS OF GALVANOMETER:**

There are five essential parts of a Galvanometer.

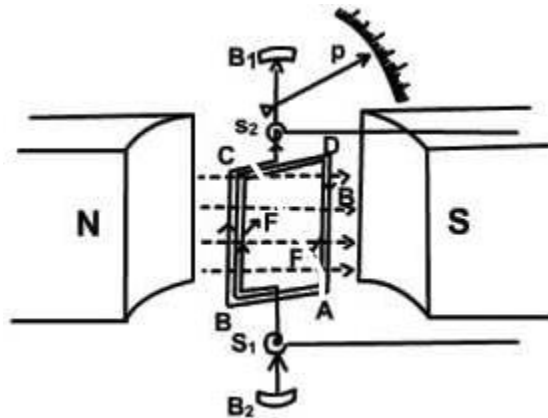
1. A U-shaped permanent magnet with concave poles.
2. Flat rectangular coil of wire.
3. A soft iron cylinder.
4. A pointer or needle.
5. A scale.

#### **CONSTRUCTION:**

The flat rectangular coil of thin enamel insulated wire of suitable number of turns wound on an aluminum frame is suspended between the poles of U-shaped magnet by a thin strip. One end of the wire of coil is soldered to connect to an external terminal. The other end is soldered to a loose and soft spiral. A soft iron cylinder is placed within the frame of coil.

#### **WORKING:**

When the current is passed through the coil it becomes a magnet. There is force of attraction is setup between the poles of magnet and coil. As a result a couple is produced in the coil and it is deflected. The current passes through the coil and the angle of deflection has a direct relation with each other. The deflection is measured by a pointer attached to the coil.



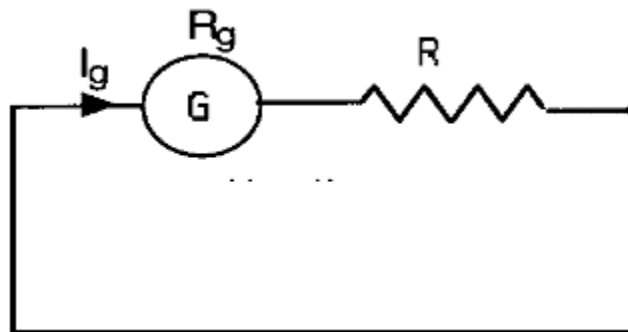
WORKING PRINCIPLE OF GALVANOMETER

**VOLTMETER:**

A voltmeter is an instrument used for measuring electrical potential difference between two points in an electric circuit. Analog voltmeters move a pointer across a scale in proportion to the voltage of the circuit. Digital voltmeters give a numerical display of voltage by use of an analog to digital converter.

**CONERSION OF GALVANOMETER TO VOLTMETER:**

For the conversion of galvanometer to voltmeter a resistor of high resistance should be connected in series with the galvanometer to form a voltmeter of desired range.



**VOLTMETER**

To find the value of resistor 'R', use the formula given below.

$$R = \frac{V}{I_g} - R_g$$



**OBSERVATIONS AND CALCULATIONS:**

| <b>V</b> | <b>R1</b> | <b>Rg</b> | <b>Rsh</b> | <b>Ig</b> | <b>R</b> |
|----------|-----------|-----------|------------|-----------|----------|
|          |           |           |            |           |          |

Table 2.1

**CONCLUSION:**

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