

**APPLIED PHYSICS LAB**

**Lab Report 2: Conversion of Galvanometer into**

**Ammeter and Voltmeter**

**Submitted To:**

Sir. Haseen Ullah Jan

**Submitted By:**

Ali Asghar

Section C

Registration No. 21PWCSE2059

Department Of Computer Systems Engineering

Fall 2021

**CONVERSION INTO AMMETER**

**AMMETER:**

It is a device used for the measurement of small current.

**SHUNT RESISTANCE:**

It is a small resistance usually ranging from 1 to 100 or 500 ohms.

**FRACTIONAL RESISTANCE BOX:**

It is a VERY small resistance like 0.1 ohms.

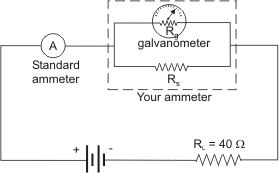
**WORKING PRINCIPLE:**

The working principle of this experiment is based on the fact that when a small resistance is connected in parallel with a galvanometer, it is converted into ammeter.

**APPARATUS:**

1. Galvanometer
2. Ammeter
3. Voltmeter
4. High Resistance Box(HRB)
5. Fractional Resistance Box(FRB)
6. Battery
7. key switches
8. Connecting Wires

**DIAGRAM:**



**PROCEDURE:**

1. **Calculating the resistance of galvanometer by half scale deflection method:** 
   1. First of all, I connected k1 and note down the deflection of galvanometer. It was out of scale.
   2. Then I applied resistance R and brought the galvanometer back to scale.
   3. Then I note the current deflection as θ1
   4. Then I plugged k2 and the galvanometer went out of scale again.
   5. I applied the resistance Rb such that to give half deflection as compared to first one i-e θ2 = 1/2θ1.
   6. The resistance Rb is equal to the resistance Rg of the galvanometer.
2. **Calculating the current Ig through galvanometer by full scale deflection method:**
   1. First of all, I connected a battery of emf E in series with the galvanometer.
   2. I inserted key and pressed it. The deflection was out of scale.
   3. Then I applied resistance from HRB and brought the galvanometer to scale.
   4. As Rg is already calculated, I calculated Ig by the following formula.
3. **Calculating Shunt Resistance:**
   1. I calculated shunt resistance by the formula.

**READINGS:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No. | R | Θ1 | Θ2=θ1/2 | Rg= Rb |
| 1 | 5000 | 30 | 15 | 140 |
| 2 | 7000 | 19 | 9.5 | 120 |
| 3 | 8000 | 17 | 8.5 | 140 |
| 4 | 10000 | 14 | 7 | 140 |
| 5 | 10700 | 13 | 6.5 | 130 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No. | Rg | R | E |  |
| 1 | 134 | 4400 | 14v | 0.3mA |

**CONVERSION INTO AMMETER**

**VOLTMETER:**

It is a device used for the measurement of potential difference.

**WORKING PRINCIPLE:**

When a high resistance is connected in series with the galvanometer, then the galvanometer is converted into voltmeter.

**APPARATUS:**

1. Galvanometer
2. Ammeter
3. Voltmeter
4. High Resistance Box(HRB)
5. Fractional Resistance Box(FRB)
6. Battery
7. key switches
8. Connecting Wires

**PROCEDURE:**

1. **Calculating the resistance of galvanometer by half scale deflection method:** 
   1. First of all, I connected k1 and note down the deflection of galvanometer. It was out of scale.
   2. Then I applied resistance R and brought the galvanometer back to scale.
   3. Then I note the current deflection as θ1
   4. Then I plugged k2 and the galvanometer went out of scale again.
   5. I applied the resistance Rb such that to give half deflection as compared to first one i-e θ2 = 1/2θ1.
   6. The resistance Rb is equal to the resistance Rg of the galvanometer.
2. **Calculating the current Ig through galvanometer by full scale deflection method:**
   1. First of all, I connected a battery of emf E in series with the galvanometer.
   2. I inserted key and pressed it. The deflection was out of scale.
   3. Then I applied resistance from HRB and brought the galvanometer to scale.
   4. As Rg is already calculated, I calculated Ig by the following formula.
3. **Calculating High Resistance:**
   1. I calculated shunt resistance by the formula.

**READINGS:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No. | R | Θ1 | Θ2=θ1/2 | Rg= Rb |
| 1 | 5000 | 30 | 15 | 140 |
| 2 | 7000 | 19 | 9.5 | 120 |
| 3 | 10000 | 14 | 7 | 140 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No. | Rg | R | E |  |
| 1 | 134 | 4400 | 14v | 0.3mA |

**PRECAUTIONS:**

1. The connections should be neat and clean.
2. Wire ends should be cleaned with sandpaper.
3. Shunt the galvanometer to prevent from damage.