

**S. Kunal Keshan**  
**RA2011004010051**

**ECE – A**

**Physics: Electromagnetic  
Theory, Quantum  
Mechanics, Waves and  
Optics- 18PYB101J**

13.05.2021

CALIBRATION OF VOLTMETER USING  
POTENTIOMETERAIM:

To Calibrate the given voltmeter by potentiometer (i.e. To check the graduations of Voltmeter and to determine the Corrections, if any).

APPARATUS REQUIRED:

Potentiometer, rheostat, battery (2V) or accumulators, keys, Daniel Cell, high resistance, sensitive table galvanometer, given voltmeter, Connecting wires, etc.

FORMULAE:

$$\text{Calibrated Voltage } V' = \frac{1.08}{l_0} \times l \text{ (volt)}$$

Where  $l_0$  = Balancing length corresponding to emf of Daniel Cell (cm)  
 $l$  = Balancing length for different Voltmeter reading (cm)

OBSERVATIONS:

Length of the wire balancing the e.m.f of the Daniel Cell

$$l_0 = 5.554 \text{ m.}$$

CALCULATIONS:

$$V' = \frac{1.08}{l_0} \times l ; V' - V ; \frac{1.08}{5.554} = 0.1944$$

$$1. V' = \frac{1.08}{5.554} \times 0.678 = 0.1318 ; V' - V = 0.0318$$

$$2. V' = 0.1944 \times 1.146 = 0.2227 ; V' - V = 0.0227$$

$$3. V' = 0.1944 \times 1.752 = 0.3405 ; V' - V = 0.0405$$

$$4. V' = 0.1944 \times 2.223 = 0.4321 ; V' - V = 0.0321$$

$$5. V' = 0.1944 \times 2.734 = 0.5314 ; V' - V = 0.0314$$

$$6. V' = 0.1944 \times 3.281 = 0.6378 ; V' - V = 0.0378$$

$$7. 0.1944 \times 3.875 = V' = 0.7533; V' - V = 0.0533$$

$$8. 0.1944 \times 4.378 = V' = 0.8549; V' - V = 0.0549$$

$$9. 0.1944 \times 5.000 = V' = 0.9720; V' - V = 0.0720$$

$$10. 0.1944 \times 5.523 = V' = 1.0736; V' - V = 0.0736$$

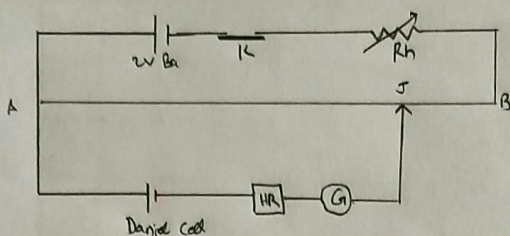
### RESULT:

The given Voltmeter is Calibrated and Calibration graph is drawn.

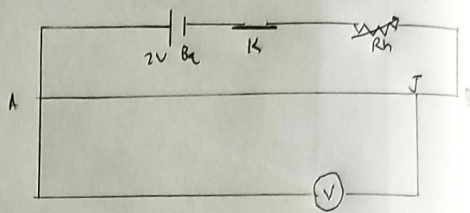


# CALIBRATION OF VOLT METER USING POTENTIOMETER

## Circuit Diagrams:



Standardization of Potentiometer



Calibration of Voltmeter

## Model Graphs:

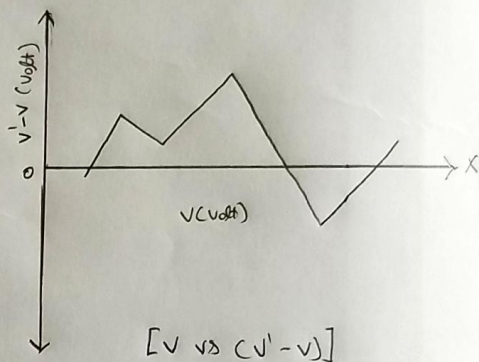
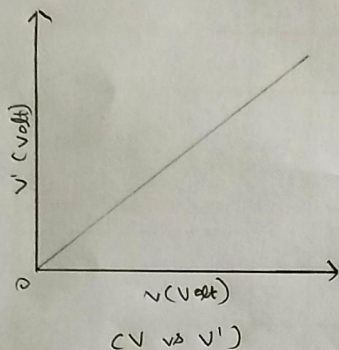


Table: To Calibrate the given Voltmeter

S.No	Voltmeter Reading (V) Volt	Balancing Length (l) m	Calculated Voltmeter Reading $V' = \frac{1.08 \times l}{l_0} \text{ (volt)}$	Correction (V' - V) Volt.
1.	0.1	0.618	0.138	0.0318
2.	0.2	1.146	0.227	0.0227
3.	0.3	1.752	0.3405	0.0405
4.	0.4	2.223	0.4321	0.0321
5.	0.5	2.734	0.5319	0.0319
6.	0.6	3.281	0.6378	0.0378
7.	0.7	3.875	0.7533	0.0533
8.	0.8	4.398	0.8549	0.0549
9.	0.9	5.000	0.9720	0.0720
10.	1.0	5.523	1.0736	0.0736



Scale:

X-axis: 1 unit = 0.1V

Y-axis: 1 unit = 0.1V

