

#7 Basic DC Meter

NAME	
University ID	
Section	
Lab time	DAY (), TIME FROM () TO ()

Exp. 7: Basic DC meters	التجربة 7 (أجهزة القياس البسيطة)
<p>Purpose of the exp.</p> <p>1 - To identify the components of DC measurement's simple devices and the way they work.</p> <p>2 - Find internal resistance value of the Galvanometer.</p> <p>3 - Convert the micrometer (galvanometer) into voltmeter.</p>	<p>أهداف التجربة:-</p> <p>1 - التعرف على مكونات أجهزة القياس البسيطة ومعرفة طريقة عملها .</p> <p>2 - إيجاد قيمة المقاومة الداخلية للجلفانومتر</p> <p>3 - تحويل الجلفانومتر إلى فولتمتر يمكنه قياس فرق الجهد الكهربائي.</p>

$$R_m = \left(\frac{V}{I_{f.s.d}} \right) - R_G$$

(Equations) القوانين الرياضية

symbol	meaning	unit
V	Battery voltage difference جهد البطارية او المولد	V
I	The total current passing through the circuit شدة التيار الكهربائي	A
$I_{f.s.d}$	The highest reading in the galvanometer device indicator أعلى قراءة يقرأها الجلفانومتر	μA
R_m	The resistance conducted in series مقاومة صندوق المقاومات الموصول على التوالي	Ω
R_s	Resistance conducted in parallel المقاومة المربوطة على التوازي مع الجلفانومتر	Ω
R_G	Internal resistance of the galvanometer مقاومة الجلفانومتر	Ω

الدائرة الكهربائية

(الأدوات:- مصدر تيار، صندوق مقاومات (R_m) ، صندوق مقاومات بقيم أصغر (R_s) ، جلفانومتر ، أسلاك توصيل)

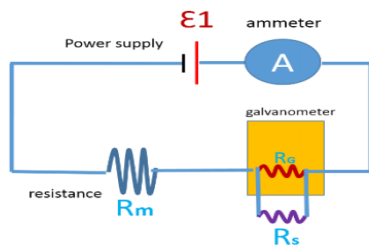


Figure 1

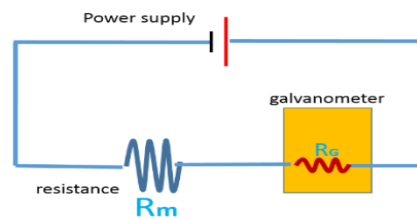


Figure 2

Procedure

a- First part (finding internal resistance off the Galvanometer)

- 1- Connect the circuit in Figure 2 and the **resistance box** in series
- 2- switch on the battery and begin to change the **resistor box** until the **micro-Ammeter** gets highest value (full scale deflection) ($I_{f.s.d}$).
- 3- we connect the **2nd resistor box** in parallel and begin to change its value until we get **half scale** of **galvanometer**.

(Note)/ when the currents and the **Galvanometer** gets to its half value, this means that the other half will go through the **resistance** connected in parallel meaning that the resistance of the **Galvanometer** will be the same parallel connected resistance.

b- Second part (Converting the Galvanometer into voltmeter)

- 1- Connect to the circuit in Figure 2 and make sure that the switches of the resistor are on their highest value.
- 2- we put the battery on the 1st given value and change the switches with monitoring the **Galvanometer** until we get to its highest value.
- 3- we record the value off the resistor box R_m resistor box and then reset the resistance of the box to its highest value again.
- 4- Repeat step 2 and 3 for all given values of voltage.

Table and calculations

The internal resistance of the device

$$R_G = \quad \Omega$$

Conversion to voltmeter

$V(volt)$	$R_m (\Omega)$	
	experimentally	Mathematically $R_m = (\frac{V}{I_{f.s.d}}) - R_G$
5		
10		
20		