

# Experiment 1

## linear and non linear circuit components

- Components used:-

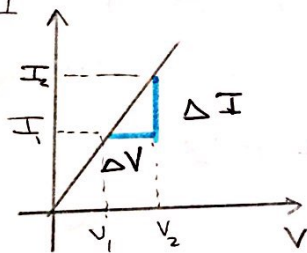
↳ Carbon resistance, light bulb and a diode

Components are

- linear components (Carbon resistance)

- The slope of the line

$$= \frac{1}{R}$$



- non-linear components

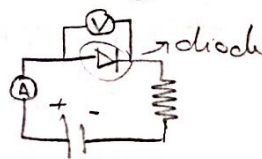
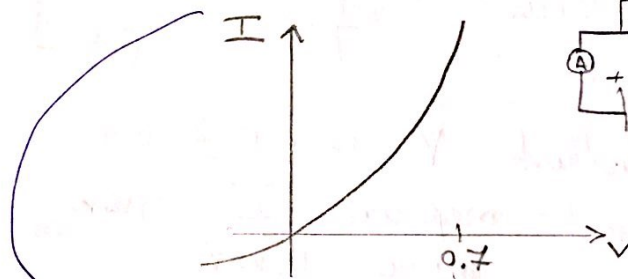
(light bulb, diode)

Diode: \*  $I = I_0 (e^{V/K} - 1)$

function of temperature

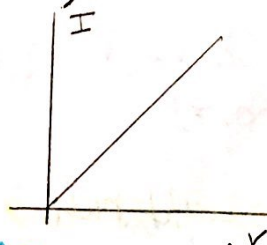
for the light bulb

\*  $R = R_0 [1 + \alpha(T - T_0)]$

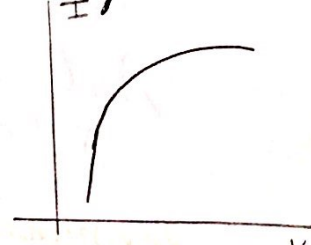


light bulb = \*

low current



high current



**Note** • A semi conducting consists of two pieces: a p-type piece and a n-type piece

- p-type with battery = forward biased
- n-type with battery = reverse biased

Alaa Etaiwi

• What we used :-

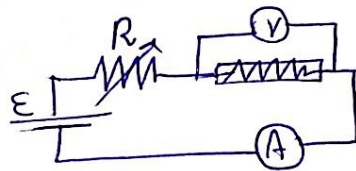
- A decade box Resistance (مقاومة متغيرة / صندوق المقاومات)
- A voltage source
- An element (Carbon Resistance, light bulb, Si diode)
- Ammeter & Voltmeter

### • Procedure :-

1- element 1 (Carbon Resistance)

• Keep changing

The value of R



to adjust V to (0.2, 0.4, ...) and measure I then draw I vs V.

2- element 2 (Si diode)

• Same as Resistance  
Carbon

And draw I vs V  
(V (0.4 — 0.7))

3- element 3 (light bulb)

• same but this time we need to measure high and low currents so voltage range will be (0.01 — 3) Volts

1- العنصر الأول (المقاومة الكربونية)

قم بتغيير قيم المقاومة المتغيرة  
حتى تصبح V تساوي

(0.2, 0.4, ..., 2) V

و قم بقياس I عند كل قيمة

V

ثم قم برسم I vs V

2- العنصر الثاني (الثنائي)

نفس الخطوات التي فعلتها  
مع المقاومة الكربونية

ثم رسم I vs V

3- العنصر الثالث (المصباح)

نفس الخطوات السابقة لكن نحتاج  
إلى قياس تيار عالي و منخفض

لذلك سنكون مدى الجهد

(0.01 — 3) Volts

Alaa Hani