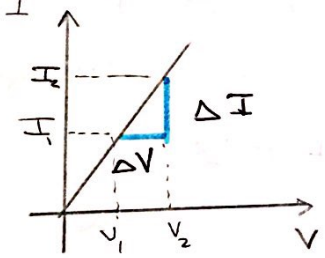
Expirement 1

linear and non linear circuit components

- Components used :-
  - ↳ Carbon resistance, light bulb and a diode

Components are

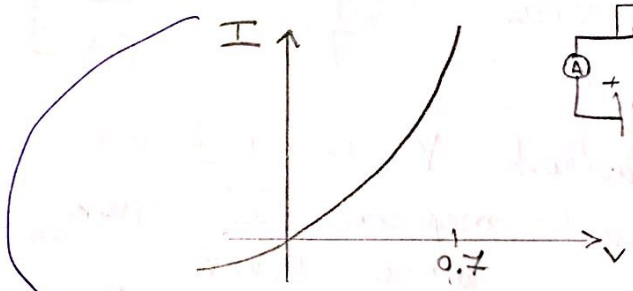
- **linear components** (carbon resistance)
  - The slope of the line $= \frac{1}{R}$

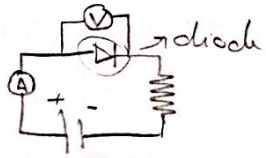


- **non-linear components** (light bulb, diode)

Diode: * $I = I_o (e^{V/k} - 1)$ (function of Temperature)

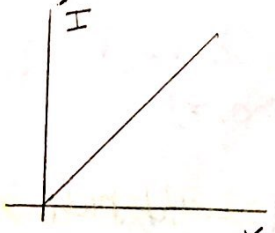
For the light bulb * $R = R_o [1 + \alpha (T - T_o)]$



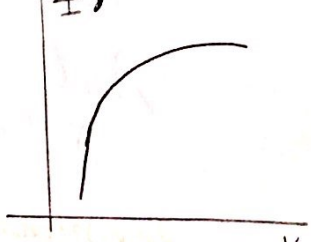


light bulb: *

low current-



high current



Note

- A semiconducting consists of two pieces: a p-type piece and a n-type piece
  - → p-type with battery = forward baised
  - → n-type with battery = reverse baised

Alaa Ftaiwi

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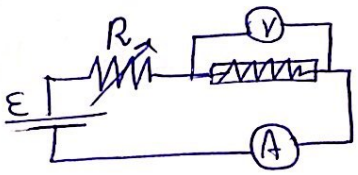
- What we used :-
  - A decade box Resistance (مقاومة متغيرة / صندوق المقاومات)
  - A voltage source
  - An element (Carbon Resistance, light bulb, Si diode)
  - Ammeter & Voltmeter

- 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.

1- العنصر الأول (المقاومة الكربونية)

قم بتغيير قيم المقاومة المتغيرة
حتى تصبح V تساوي
(0.2, 0.4 ---- 2)V
وقم بقياس I عند كل قيمة
لـ V
ثم قم برسم I vs V

2- element 2 (Si diode)

- Same as Carbon Resistance

And draw I vs V
(V (0.4 ---- 0.7))

2- العنصر الثاني (الثنائي)

نفس الخطوات التي قمت بها
مع المقاومة الكربونية
ثم ارسم I vs V

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

3- العنصر الثالث (المصباح)

نفس الخطوات السابقة لكن نحتاج
إلى قياس تيار عالي و منخفض
لذلك سيكون مدى الجهد
(0.01 ---- 3) Volts

Alaa Hatawi

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