

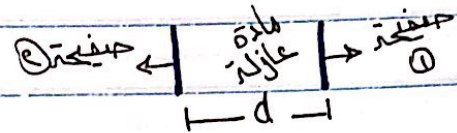
Part (1) :

Exp (9) : RC Circuit :

• Notes about Capacitor ?

• What Does (RC) Means ?

- **R** → Resistor (المقاوم)
- **C** → Capacitor (المكثف)



Note: at this experiment
The voltage is Direct (DC)

- يمتد المكثف (C) ؟
- مساحة الصفائح
- المسافة بينها
- معامل عازلية العازل

• يشحن المكثف تدريجياً حتى يصل إلى قيمة له عند جميع فرق الجهود بين طرفيه
متساوياً لفرق الجهود بين طرفي البطارية. لو كان ذلك يتفرغ تدريجياً.

$$\text{charge} \leftarrow Q = C V \rightarrow \text{voltage} \quad \text{---} \quad \textcircled{1}$$

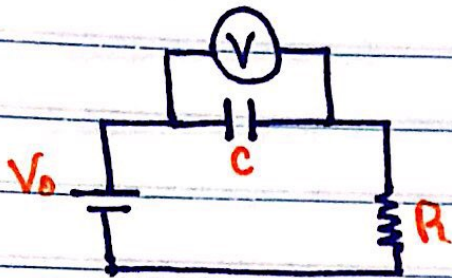
Capacitance

• Capacitance unit = Colum / Volt = Farad.

Part (2) :

III Charging :

الخطوة الأولى : شحن المواسع :



$$q = CV_0 (1 - e^{-t/RC})$$

From equation 1 : $q = CV$ so :

$$CV = CV_0 (1 - e^{-t/RC})$$

voltage at any time Max. voltage

$$V = V_0 (1 - e^{-t/RC})$$

When $(-t) = \infty$,

$$V = V_0$$

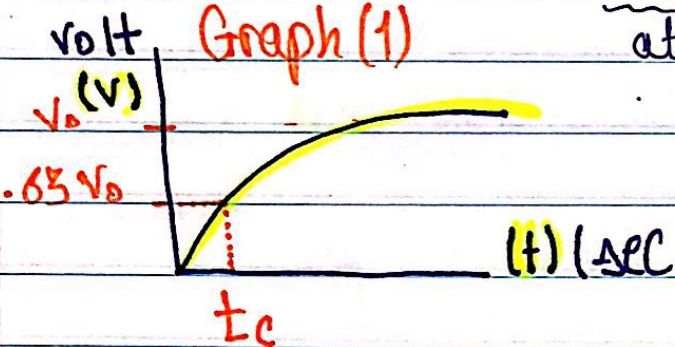
When $(-t) = RC$,

$$V = V_0 (1 - e^{-RC/RC}) \rightarrow .37$$

$$V = .63 V_0$$

at $t = RC = \tau \rightarrow$ time constant.

Graph (1)

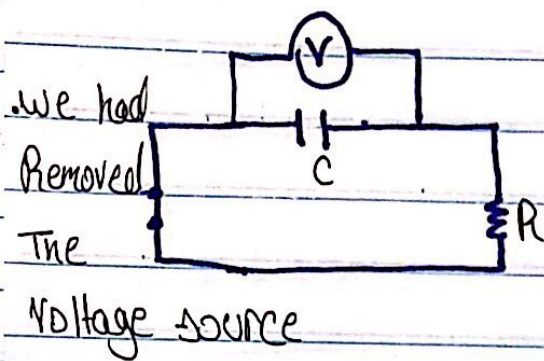


$$t_c = t_{\text{charge}}$$

Part (3):

الخطوة الثانية في التجريب

121 Discharging:



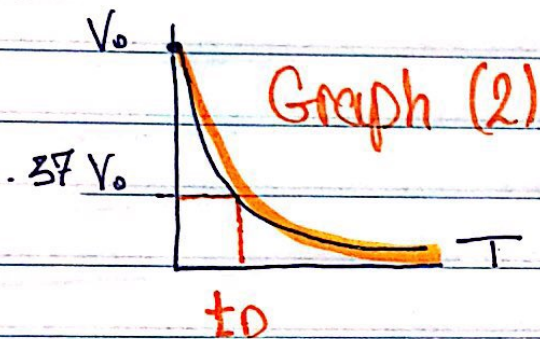
$$q = C V_0 e^{-t/RC}$$

$$CV = C V_0 e^{-t/RC}$$

$$V = V_0 e^{-t/RC}$$

at $t = RC$

$$V = V_0 (0.37)$$



$t_0 = t_{\text{Discharge}}$

theoretically $t_0 = t_c$

Note we draw each Graph 1 and 2 at the linear paper.

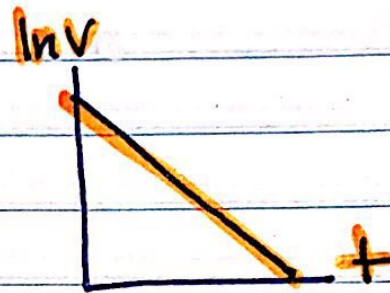
Drawing of semilog paper?

$$V = V_0 e^{-t/RC} \quad (\text{Took } \ln)$$

$$\ln V = \ln V_0 + \left(\frac{-t}{RC} \right) = t\text{-slope}$$

$$\ln V = \underbrace{-t}_{\substack{\downarrow \\ \text{Y-axis}}} + \ln V_0$$

$\underbrace{t}_{\substack{\downarrow \\ \text{The slope}}} \xrightarrow{\text{X-axis}}$



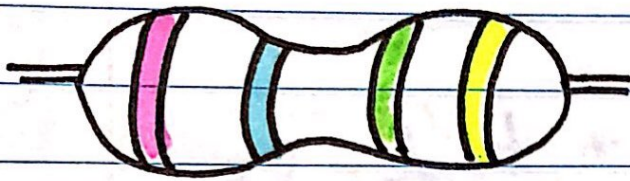
Calculations :

$$\bar{E} \text{ (Average)} = \frac{t_s + t_c + t_d}{3}$$

$$\text{The } \text{unc}_0 = \bar{E} \pm \sigma_m$$

$$\text{The Capacitor } (C) = \frac{\bar{E}}{R}$$

$$\text{unc}_0 = \frac{\Delta C}{C} = \frac{\Delta \bar{E}}{\bar{E}} + \frac{\Delta R}{R}$$



- Band A
- Band B
- Band C
- Band D

تعمیر
نکات
(R)

Thes. 8 $AB \times 10^C \neq (D\%) \cdot R$
v .
قیمت الحقیقی