

LAB 5 - RC CIRCUIT



* CHARGE ON THE CAPACITOR

$$q_c(t) = q_0 (1 - e^{-t/\tau})$$

WHERE $\tau = RC$

q_0 IS THE MAX CHARGE ON C

SO: IF $t=0 \rightarrow q_c = 0$

$t=\infty \rightarrow q_c \approx q_0 = CV$

VOLTAGE ACROSS CAPACITOR

$$V_c(t) = V_0 (1 - e^{-t/\tau})$$

SO: \uparrow MAX VOLTAGE OF "C"

$t=0 \rightarrow V_c = 0$

$t=\infty \rightarrow V_c \approx V_0$

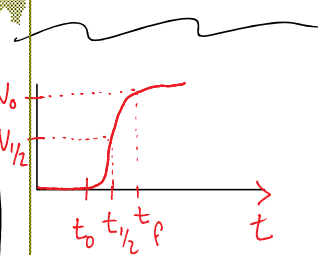
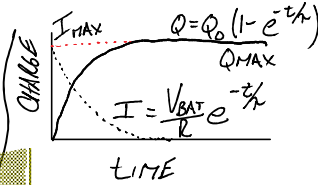
CHARGING PROCESS

$$V = IR + \frac{Q}{C}$$

\downarrow CHARGE INCREASES
 \downarrow CURRENT DECREASES

CHARGING TIME: $t_{1/2} = RCLN 2$

$t_{1/2} = \tau LN 2$



EXPERIMENT

POWER ATP

- POSITIVE SQUARE WAVE
4V @ 0.1 Hz

SAMPLING OPTIONS

- AUTO STOP \rightarrow 20 SEC.

GRAPH

VOLTAGE VS TIME

\rightarrow DECIMALS \sim 5

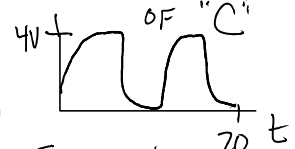
MAX CHARGE: $q_0 = C_{MEAS} \times V_{INPUT}$

LAB REPORT

- COVER SHEET, QUESTIONS

- Z PLOTS

\rightarrow FIG 1: CHARGE/DISCHARGE



\rightarrow FIG 2: HALF-LIFE ($t_{1/2}$)

