

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"

$t=0 \rightarrow V_c = 0$

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

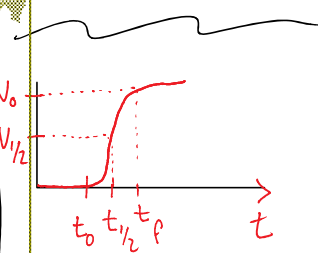
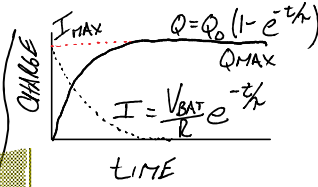
CHARGING PROCESS

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

↑ CHARGE INCREASES  
↓ CURRENT DECREASES

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

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



EXPERIMENT

POWER APT

- POSITIVE SQUARE WAVE  
4V @ 0.1 Hz

SAMPLING OPTIONS

- AUTO STOP  $\rightarrow$  20 SEC.

GRAPH

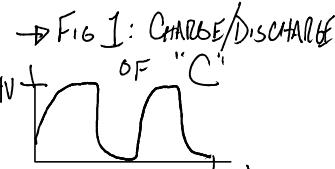
VOLTAGE VS TIME

$\rightarrow$  DECIMALS  $\sim$  5

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

LAB REPORT

- COVER SHEET, QUESTIONS
- Z PLOTS



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

