March 26, 2014

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**Lab # 3**

**Time constant of RC – Circuit**

**Objective:**

To measure the times constant of RC for different values of capacitor and resistance to its theoretical value.

**Data/ Results:**

Let’s R is a resistance (Ω) C is a capacitance (C)

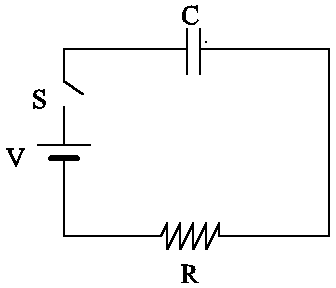
τ is a time constant(s) : time half in millisecond (s)

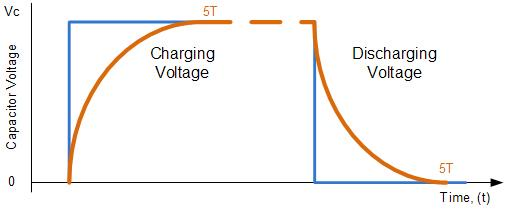
Charging capacitor ∆V (t) =∆ (1-

Discharging capacitor ∆V (t) = ∆

: Time constant of theory (s)

: Time constant of measure (s)





Example: trial #1: R = 1500Ω , C= 0.3 \* C , T1/2 = 3/5 x 10-3s

Unit of time constant theory

= R\*C = 1500 \* 0.3 \* = 4.5 x s

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|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Trial #** | **R(** | **C(C)** | **T1\2 s** | **T (exp) s** | **T (the) s** |
| 1 | 1500 | 0.3 x 10-6 | 3/5 x 10-3 | 8.66 x 10-4 | 4.5 x 10-4 |
| 2 | 1500 | 0.5 x 10-6 | 1/2x 10-3 | 7.21 x 10-4 | 7.5 x 10-4 |
| 3 | 1500 | 0.7 x 10-6 | 3/5 x 10-3 | 8.66 x 10-4 | 10 x 10-4 |
| 4 | 1500 | 1 x 10-6 | 2/5 x 10-3 | 5.77 x 10-4 | 15 x 10-4 |
| 5 | 1000 | 0.5 x 10-6 | 2/5 x 10-3 | 5.77 x 10-4 | 5 x 10-4 |
| 6 | 2000 | 0.5 x 10-6 | 3/5 x 10-3 | 8.66 x 10-4 | 10 x 10-4 |
| 7 | 3000 | 0.5 x 10-6 | 9/10 x 10-3 | 1.3 x 10-4 | 15 x 10-4 |
| 8 | 4000 | 0.5 x 10-6 | 3/5 x 10-3 | 8.66 x 10-4 | 20 x 10-4 |

**Conclusion:**

A capacitor was connected with resistor and its charging and discharging was observed on an oscilloscope. On a data, resistance is increasing, time half increasing and time constant theory and measure is increasing too. Besides, to solving the time constant measure in second, use unit of resistance multiplied with capacitor, convert and cancel each other. The result the time constant measure is a second.