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EXPERIMENT - 9

AIM:

Measurement of high resistance by Ballistic Galvanometer.

Observations:

Capacitance, $C = 0.8\ \mu F$
Theoretical value of resistance, $R_o = 8\ X\ 10^6\ ohm$
Time of charging of Capacitor, $t_o = 20\ sec$

S.no.	First deflection, θ_o	Time, t(sec)	Deflection after discharge, θ_t	$\dfrac{\theta_o}{\theta_t}$	$log_{10}\left(\dfrac{\theta_o}{\theta_t}\right)$
01.	20	1.55	17.11	1.1689	0.06778
02.	20	2.50	14.63	1.3670	0.13577
03.	20	3.32	12.52	1.5974	0.20341
04.	20	4.30	10.71	1.8674	0.27124
05.	20	5.21	9.16	2.1834	0.33913
06.	20	7.22	6.70	2.9850	0.47494
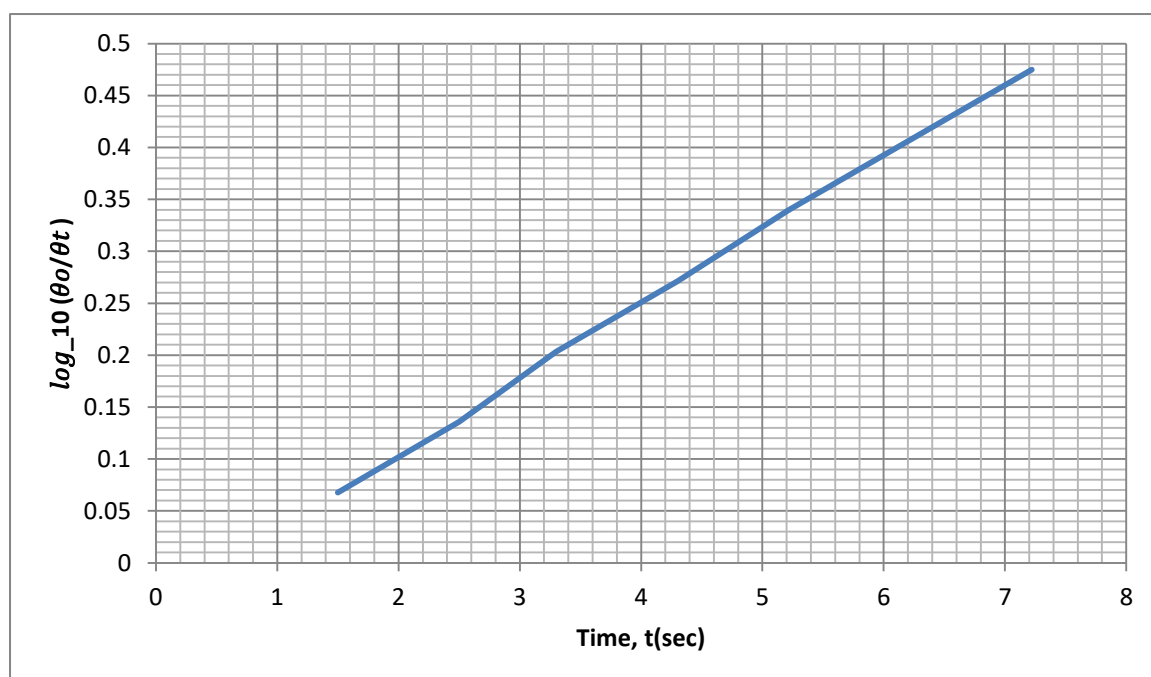
Calculations:

Let 2 points on the graph be (6.2, 0.4) and (4.7, 0.3),

Slope of graph, m = $\frac{0.4-0.3}{6.2-4.7} = 0.066667\ per\ sec$

Resistance, $R = \dfrac{1}{2.303*C*slope(m)}$

$R = \dfrac{10^6}{2.303*0.8*0.066667} = 8.1415545\ X\ 10^6\ ohm$

Percentage Error:

$\%e = \dfrac{R-R_o}{R_o} X\ 100 = \dfrac{8.1415545-8}{8} X\ 100 = 1.76943\%$

Results:

The calculated value of high resistance $R = 8.1415545\ X\ 10^6\ ohm$ with a percentage error of $\%e = 1.76943\%$.