2do Parcial

Caballero Burgos
Carlos Eduardo

1.)

#	t[s]	V[v]
1	5	6
2	10	4.4
3	15	3
4	20	2.2
5	25	1.8
6	30	1.2
7	35	1.0
8	40	0.8

Descarga. $C = 6400\ \mu F$

$V = V_0 e^{-\frac{t}{RC}}$

$\ln V = \ln V_0 e^{-\frac{t}{RC}}$

$\ln V = \ln V_0 - t/RC$

$\ln V = \ln V_0 - \frac{1}{RC} t$

$V' = \ln V$

$A = \ln V_0$

$B = -\frac{1}{RC}$

$t' = t$

#	t'	V'	t'^2	V'^2	$t'V'$	Y	d	d^2
1	5	1.79	25	3.21	8.96	1.73	0.06	3.49×10^{-3}
2	10	1.48	100	2.19	14.82	1.43	0.04	1.37×10^{-3}
3	15	1.10	225	1.20	16.48	1.14	-0.04	2.06×10^{-3}
4	20	0.79	400	0.62	15.77	0.85	-0.06	3.75×10^{-3}
5	25	0.59	625	0.34	14.69	0.55	0.032	1.05×10^{-3}
6	30	0.01	900	0.01	7.86	0.26	-0.17	2.75×10^{-2}
7	35	0	1225	0	0	-0.03	0.03	1.11×10^{-3}
8	40	-0.22	1600	0.05	-8.93	-0.33	0.10	1.09×10^{-2}
Σ	180	5.62	5100	7.63	64.65			0.0517

$A = 2.0270$

$B = -0.0589$

$\Delta = 8400$

$\sigma^2 = 8.6789\times10^{-5}$

$\sigma_A = 0.0723$

$\sigma_B = 2.8650\times10^{-3}$

$R = -0.9930$

$A = (2.03 \pm 0.07)[v]$; 3.56%

$B = (-0.059 \pm 0.003)[s^{-1}]$; 4.

$V_0 = e^A = 7.5912$

$t = RC = -1/B = 16.988$

$\frac{\partial t}{\partial B} = \frac{1}{B^2}\sigma_B = 0.8269$

$V(t) = 7.59\, e^{-\frac{t}{17}}\ [V]$

$\tau = (17.0 \pm 0.8)[s]$; 4.86%

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Descarga: $C = 6400\ \mu F$

$V = V_0 e^{-\frac{t}{RC}}$

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1	5	1.79	25	3.21	8.96	1.73	0.06	3.49×10^{-3}
2	10	1.48	100	2.19	14.82	1.43	0.04	1.87×10^{-3}
3	15	1.10	225	1.20	16.48	1.14	-0.04	2.06×10^{-3}
4	20	0.79	400	0.62	15.77	0.85	-0.06	3.75×10^{-3}
5	25	0.59	625	0.34	14.69	0.55	0.03	1.05×10^{-3}
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Σ	180	5.62	5100	7.63	64.65			0.0517

$A = 2.0270$

$B = -0.0589$

$\Delta = 8406$

$\sigma^2 = 8.6789\times10^{-3}$

$\sigma_A = 0.0723$

$\sigma_B = 2.8650\times10^{-3}$

$R = -0.9930$

$A = (2.03 \pm 0.07)[V]$, 3.56%

$B = (-0.059 \pm 0.003)[s^{-1}]$; 4.86%

$V_0 = e^A = 7.5912$

$t = RC = -1/B = 16.988$

$\frac{\partial t}{\partial B} = \frac{1}{B^2}\sigma_B = 0.8269$

$V(t) = 7.59\, e^{-\frac{t}{17}}\ [V]$

$\tau = (17.0 \pm 0.8)[s]$; 4.86%

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2)

Area = 100 [mm²]

Voltaje = 1.5 [V]

#	d [mm]	C [pF]
1	10.0	0.09
2	9.0	0.10
3	8.0	0.11
4	7.0	0.13
5	6.0	0.15
6	5.0	0.18
7	4.0	0.22
8	3.0	0.30

$C = \varepsilon_0 \frac{A}{d}$ $\quad C = \varepsilon_0 A d^{-1}$

$\ln C = \ln \varepsilon_0 A - \ln d$

$C' = \ln C$

$A = \ln \varepsilon_0 A$

$B = -1$

$d' = \ln d$

$mm^2 \quad \frac{1}{m}$

$100 \quad mm$

#	d'	C'	d'²	C'²	d'C'	Y	d	d²
1	-4.60	-30.04	21.11	902.34	138.33	-30.04	2.30×10^{-3}	5.28×10^{-6}
2	-4.71	-29.93	22.19	896.02	141.00	-29.94	2.71×10^{-3}	7.33×10^{-6}
3	-4.83	-29.84	23.31	890.32	144.07	-29.82	-1.93×10^{-2}	3.73×10^{-4}
4	-4.96	-29.67	24.62	880.38	147.22	-29.69	1.47×10^{-2}	2.17×10^{-4}
5	-5.11	-29.53	26.17	871.91	151.07	-29.53	4.27×10^{-3}	1.83×10^{-5}
6	-5.30	-29.35	28.07	861.18	155.57	-29.35	4.99×10^{-3}	2.49×10^{-5}
7	-5.52	-29.19	30.49	849.24	160.12	-29.13	-1.66×10^{-2}	2.76×10^{-4}
8	-5.81	-29.83	33.75	831.96	167.51	-29.84	6.93×10^{-3}	4.8×10^{-5}
Σ	-40.35	-236.34	260.91	6933.1	1205.6			1.20×10^{-3}

$A_1 = 1673$ $\quad \sigma^2 = 16174\times10^{-4}$ $\quad A = (-34.63 \pm 0.06)$ [u]; 0.17%

$A_2 = 1.0067$ $\quad \sigma_A = 0.0592$ $\quad B = (-1 \pm 0.01)$ [u]; 1.16%

$\sigma_B = 0.0115$ $\quad R = -0.9996$

$A = -34.629$

$B = -0.9961$

$A = \ln C_0 A$ $\quad C_0 = \frac{e^A}{A} = 9.1407\times10^{-12}$

$e^A = C_0 A$