Eqn (1) and fig show that the charge of a capacitor ... time to reach ... maximum value

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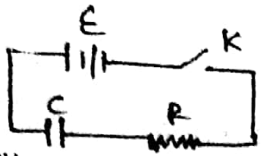

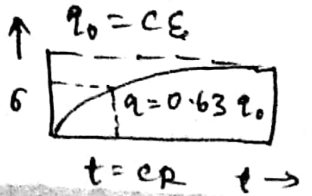

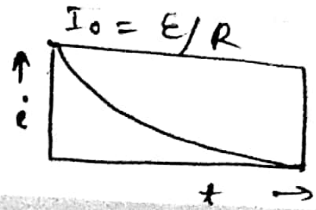

Since when $t = 0$, $q = 0$, hence

const $= -C \log_e \mathcal{E}$ and therefore

$$\log_e (\mathcal{E} - q/C) = -t/CR + \log_e \mathcal{E}$$

$$\therefore \quad \log_e \frac{\mathcal{E} - q/C}{\mathcal{E}} = -\frac{t}{CR}$$

or,

$$\frac{\mathcal{E} - q/C}{\mathcal{E}} = e^{-t/CR}$$

Evening

or,

$$q = C\mathcal{E}\left(1 - e^{-t/CR}\right) = q_0\left(1 - e^{-t/CR}\right)$$

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where $q_0 = C\mathcal{E}$ = maximum charge ... with the capacity.

The current

$$i = \frac{dq}{dt} = \frac{C\mathcal{E}}{CR} e^{-t/CR} = \frac{\mathcal{E}}{R} e^{-t/CR}$$

The current and charge are therefore both exponential functions of time. At a time $t = RC$, the current has decreased to $1/e^{th}$ of its initial value. The prod...

Evening

RC is known as the time constant or the relaxation time of the circuit. It is the time taken for the capacitor to acquire 63% of its maximum charge

May 04

M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						