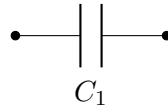


1 Capacitance definition:

Capacitance is the ratio of the change in an electric charge in a system to the corresponding change in its electric potential.

2 Capacitor symbol:



3 Capacitance equation:

$$Q = CV$$

Where C is capacitance (F), Q is the charge (C) stored in the and V is the potential difference (V) between the plates.

4 Capacitance equation (given area and distance of plates):

$$C = \varepsilon \frac{A}{d}$$

Where C is **capacitance** (F), ε is **absolute permittivity** ($\varepsilon_0 \varepsilon_r$), A is the **common area** (m²) of overlap and d the **separation** (meter) of the plates.

5 Charging capacitor:

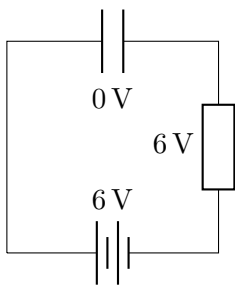


Figure 1: Uncharged capacitor

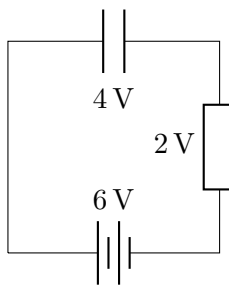


Figure 2: Some time after charging

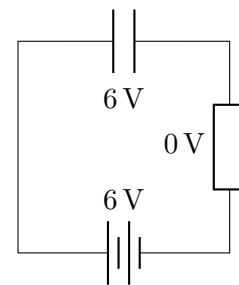


Figure 3: Fully charged capacitor

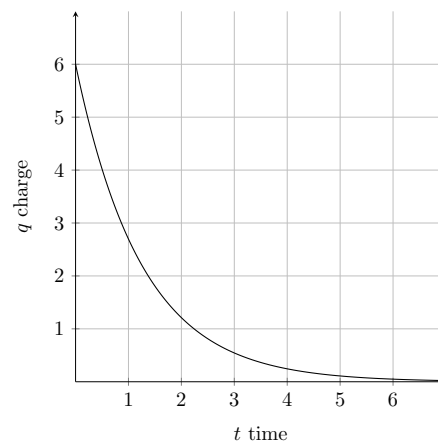
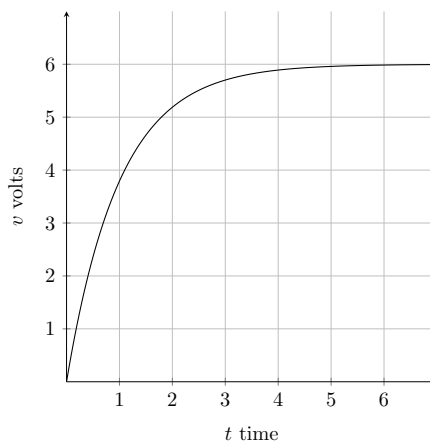
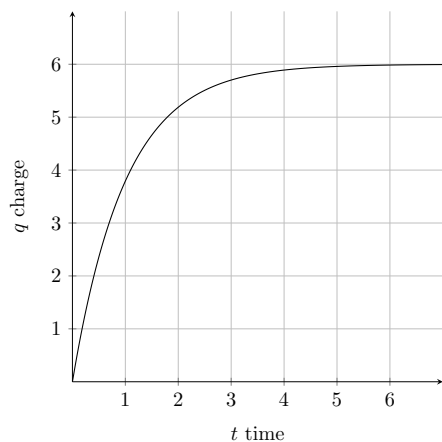
6 Charge of capacitor at any given second:

$$Q = It \quad (C)$$

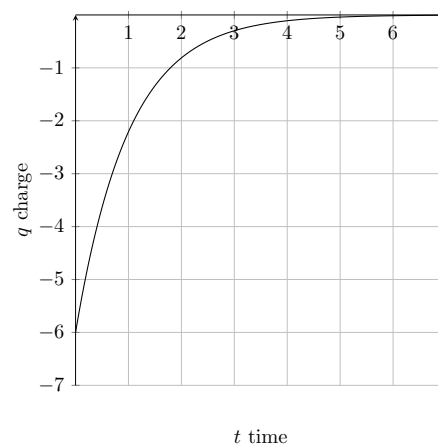
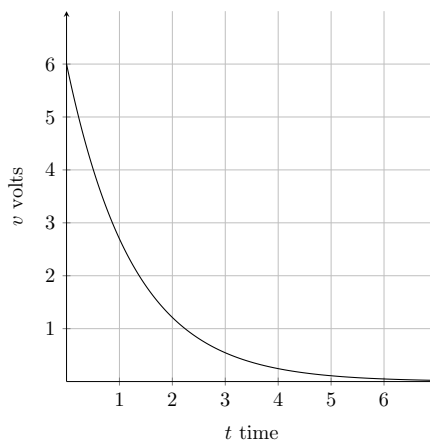
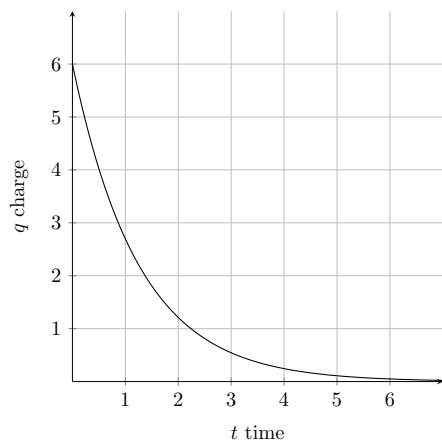
7 Dis/charging time formula:

$$\tau = RC \quad (s)$$

8 Charging graphs:



9 Discharging graphs:

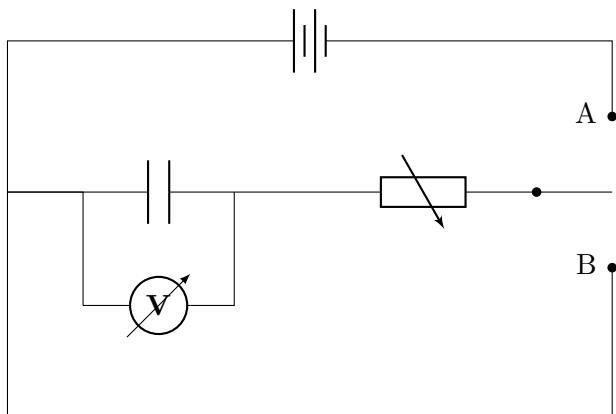


Gradient: $\frac{\delta q}{\delta t} = I$

Gradient: $\frac{\delta V}{\delta t}$

Gradient: $\frac{\delta I}{\delta t}$

10 Dis/charging capacitor circuit:



A: Charging at 63% every τ .
B: Discharging at 37% every τ .