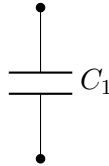# 1   Capacitance definition:

Capacitance is defined as the amount of charge a capacitor can store per unit potential difference across it.

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 (m^2) of overlap and d the seperation (meter) of the plates.
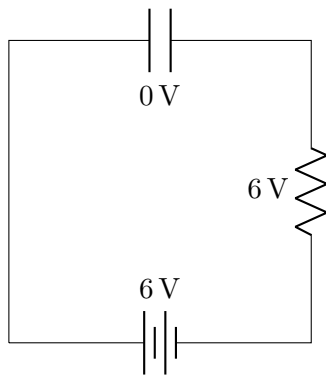
5   Charging capacitor:
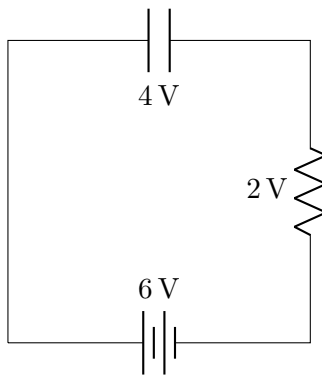

Figure 1: Uncharged capacitor
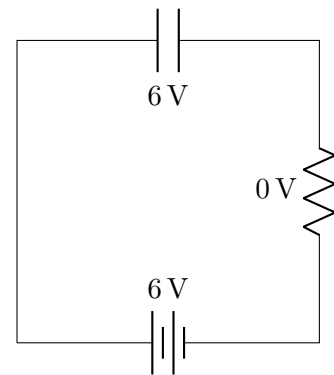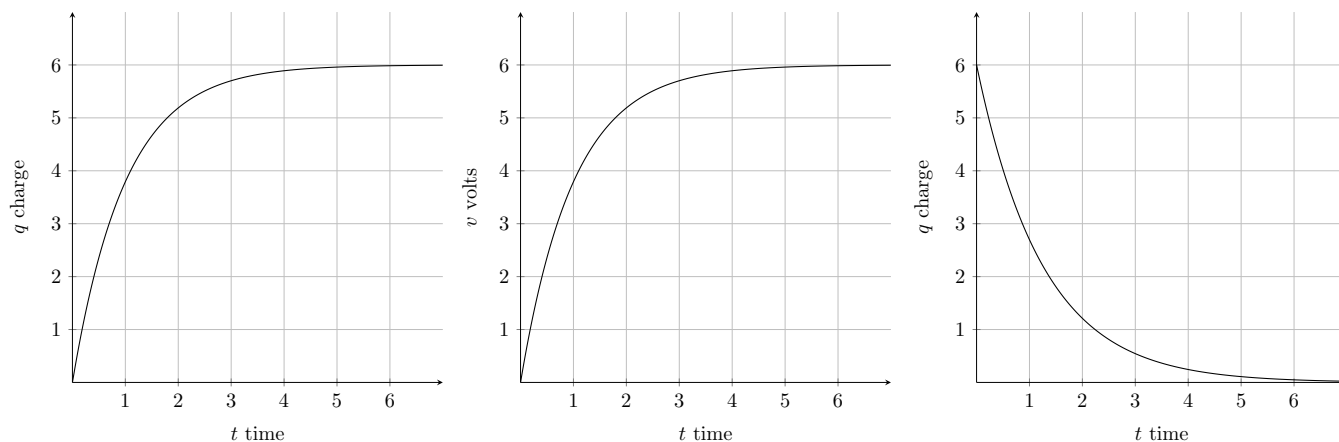

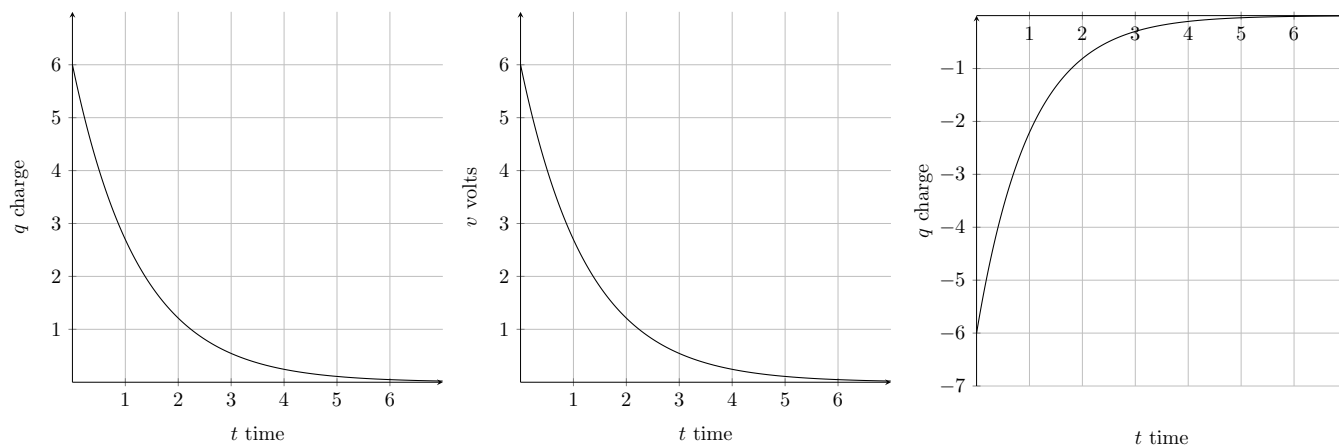Figure 2: Some time after charging

Figure 3: Fully charged capacitor

6   Charge of capacitor at any given second:

$$Q = It$$

7 Charging graphs:
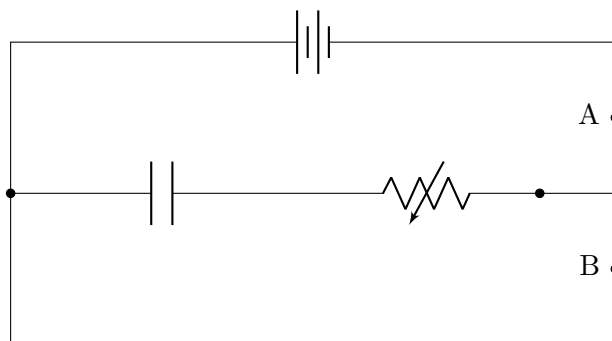
8 Discharging graphs:

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

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

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

9 Dis/charging capacitor circuit:

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

10   Dis/charging time formula:

$$\tau = RC$$

The convention is that after 5τ seconds the capacitor discharges.