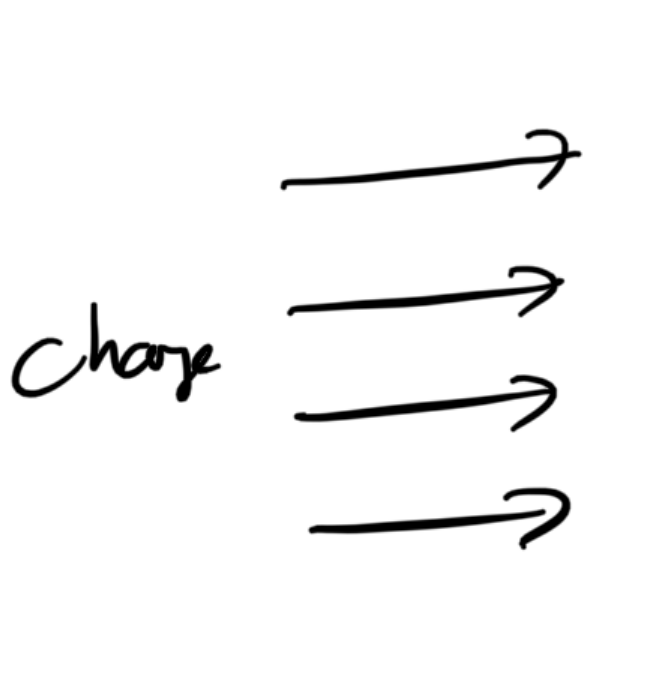
Phys 202 - A4 - 10-11

10. Electric Current:



i Current $\equiv$ How much charge flows past each second?

(C/s)

$\uparrow_{\equiv}$ Ampère $\equiv$ A

$$i \equiv \frac{\Delta Q}{\Delta t} \rightarrow \frac{dQ}{dt}$$

$$\Delta Q = i\,\Delta t = (30 \times 10^{-6} A)(30 s)$$

$$\Delta Q = 9 \times 10^{-4} C$$

Important: Total Amount of

$$\#\text{ of things} = \frac{\text{Thing}}{\text{Amount in each thing.}}$$

$$\#\text{ of apples} = \frac{\text{Total Mass of Apples}}{\text{Mass of 1 apple.}}$$

$$\#\text{ of electron} = \frac{\text{Total Charge}}{\text{Charge of 1 electron.}}$$

$$= \frac{9 \times 10^{-4}\ C}{1.602 \times 10^{-19}\ C}$$

$$= 563 \times 10^{15} \text{ electrons.}$$

11.

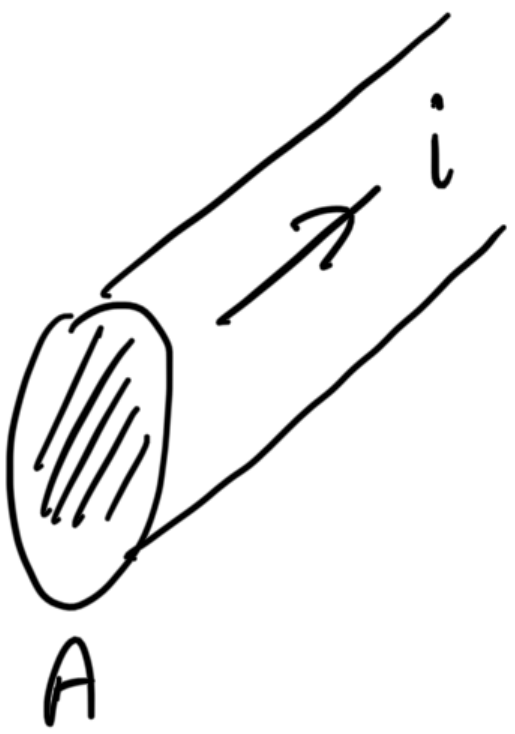
$$q = 4t^3 + 5t + 6$$

a) $$i = \frac{dq}{dt} = 12t^2 + 5$$

$$i(0.94) = \frac{dq}{}(0.94) = 12(.94)^2 + 5$$

$$\frac{dQ}{dt} = 15.6\ A$$

b) $$j \equiv \frac{i}{A} = \frac{15.6\ A}{1.96 \times 10^{-4}\ m^2}$$



$$= 79600\ A/m^2$$

$$= 79.6\ kA/m^2$$