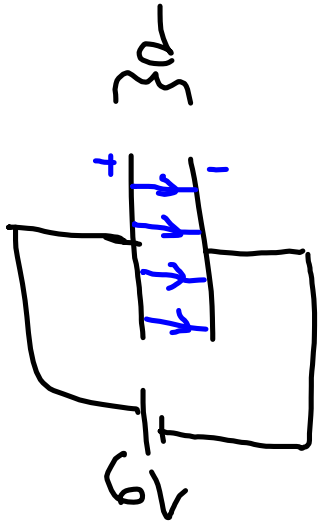
$V = Ed$

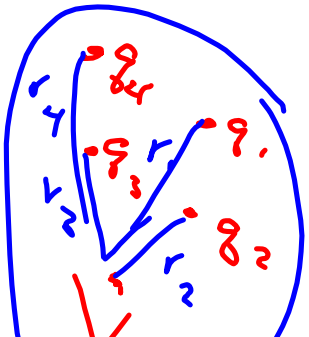
potential diff, voltage, electric potential



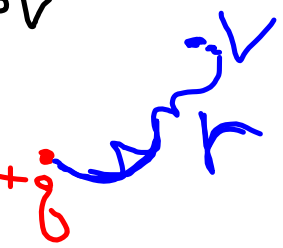
$V = Ed = \frac{1}{4\pi\varepsilon_0}\frac{q}{r^2}\,d$

$V = \frac{1}{4\pi\varepsilon_0}\frac{q}{r}$

$V = \frac{1}{4\pi\varepsilon_0}\sum\frac{q}{r}$



$V = \frac{1}{4\pi\varepsilon}\left(\frac{q_1}{r_1} + \frac{q_4}{r_2} + \frac{q_2}{r_3} + \frac{q_4}{r_4}\right)$



$$\vec{E} = \frac{\vec{F}}{q_{point}}$$

q_{point} ↑ F

$$E = \frac{1}{4\pi\varepsilon_0}\cdot\frac{q_{source}}{r^2}$$

q_{source}

$$V = Ed = \frac{1}{4\pi\varepsilon_0}\frac{q_{source}}{r}$$

$$PE = U_E = qV$$

$$= \frac{1}{4\pi\varepsilon_0}\frac{qq}{r}$$

$\frac{C\cdot J}{C}$

$1eV = 1.6\times10^{-19}J$

(2) $U_E = K$

$= \frac{1}{2}mv^2$

(22)

$F_G + F_E = F_C$

$K = \frac{1}{2}mv^2$

$$K = \frac{1}{2}\left(\frac{1}{4\pi\varepsilon_0}\frac{q^2}{r}\right)$$

$$\frac{1}{4\pi\varepsilon_0}\frac{q^2}{r^2} = m\frac{v^2}{r}$$

$$q\sqrt{\frac{1}{4\pi\varepsilon_0}\frac{1}{mr}} = V$$

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$$F_G = G \frac{m\,m}{r^2}$$

$$= 6.67 \times 10^{-11} \frac{N m^2}{kg^2} \left(\frac{(-27)(-31)}{\quad} \right)$$

$$F_E = \frac{1}{4\pi\varepsilon} \frac{q\,q}{r^2}$$

$$= 9 \times 10^9 \frac{N m^2}{C^2} \left(\frac{(-19)(-19)}{\quad} \right)$$