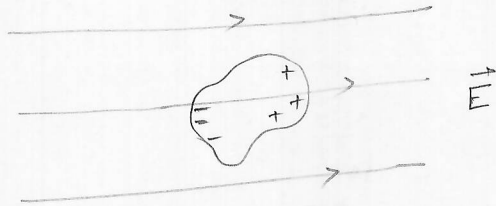


Problem 1

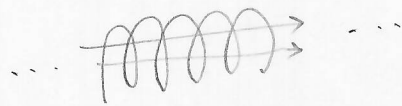


Problem 2

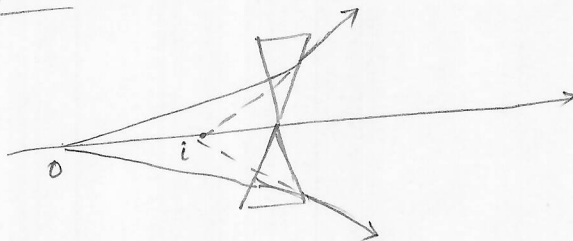
$$\left. \begin{aligned} V = IR &\Rightarrow R = \frac{V}{I} \\ V = \frac{Q}{C} &\Rightarrow C = \frac{Q}{V} \end{aligned} \right\} \Rightarrow RC = \frac{Q}{I} \Rightarrow [RC] = T = \text{time}$$

Problem 3

A solenoid. Helical coil of zero pitch.



Problem 4



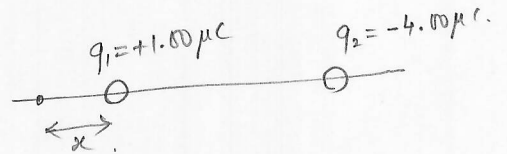
o - object
i - image.

Problem 5

$$|\vec{E}_1| = |\vec{E}_2|$$

$$\frac{1}{4\pi\epsilon_0} \frac{q_1}{x^2} = \frac{1}{4\pi\epsilon_0} \frac{q_2}{(D+x)^2}$$

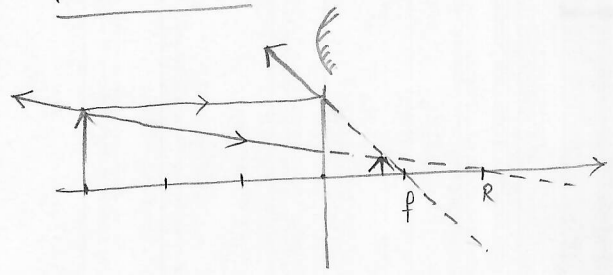
$$D+x = \sqrt{\frac{q_2}{q_1}} x$$



$$x = \frac{D}{\sqrt{\frac{q_2}{q_1}} - 1} = \frac{D}{\sqrt{\frac{4.00}{1.00}} - 1} = D$$

D with to left of q_1 .

Problem 6



(e) $m = -\frac{d_i}{d_o} = -\frac{(-7.50\text{cm})}{(30.0\text{cm})} = +0.25$

$\frac{h_i}{h_o} = m \Rightarrow h_i = +0.25\text{cm}$

(d) upright.

(a) $f = -10.0\text{cm}$
 $R = -20.0\text{cm}$

(b) $\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$

$\frac{1}{30.0} + \frac{1}{d_i} = -\frac{1}{10.0}$

$\frac{1}{d_i} = -\frac{1}{30.0} - \frac{1}{10.0} \Rightarrow d_i = -7.50\text{cm}$
 virtual image.

Problem 7



(a) $\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$

$\frac{1}{30.0} + \frac{1}{d_i} = \frac{1}{10.0}$

$\frac{1}{d_i} = \frac{1}{10.0} - \frac{1}{30.0} \Rightarrow d_i = +15.0\text{cm}$
 real image.

(b) $m = -\frac{d_i}{d_o} = -\frac{(+15.0\text{cm})}{(+30.0\text{cm})} = -0.50$

$\frac{h_i}{h_o} = m \Rightarrow h_i = -0.50\text{cm}$

(c) inverted