Announcements:

— Public lecture & schedule
— Physics tutor

Chapter 17

Lenses and Optical Instruments

Equations

$$\frac{1}{f} = (n-1)\left(\frac{1}{R_A} - \frac{1}{R_B}\right)$$

$$\frac{1}{s_o} + \frac{1}{s_i} = \frac{1}{f}$$

$$M \left(= h_i/h_o\right) = -s_i/s_o$$

magnifying glass

$M_A = \theta'/\theta$, $N = 25\text{cm}$

only equations on microscope and telescope

$M_A = -f_{obj}/f_{eye}$ for a telescope (& drawing of how it works)

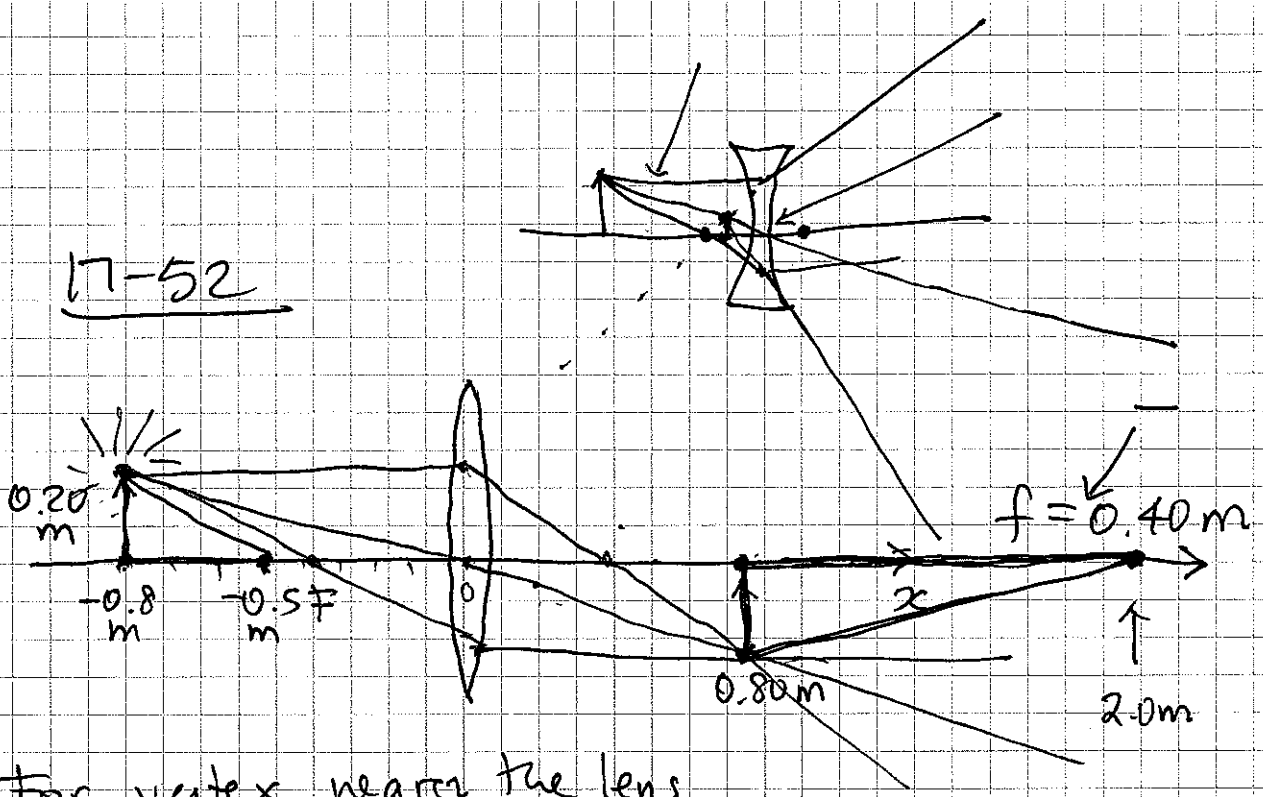
Problems

Be ready to answer questions & solve problems like those assigned for homework, plus:

17-52, 17-53

17-75, 17-70

17-52



- For vertex near the lens

$s_o = 0.50\ m$

use $\frac{1}{s_o} + \frac{1}{s_i} = \frac{1}{f}$, $\frac{1}{s_i} = \frac{1}{f} - \frac{1}{s_o} = \frac{1}{0.40} - \frac{1}{0.50} = 2.5 - 2.0$

$= 0.5\ m^{-1}$

$s_i = 2.0\ m$

- For the back

$s_o = 0.80\ m$

use $\frac{1}{s_i} = \frac{1}{f} - \frac{1}{s_o} = \frac{1}{0.40} - \frac{1}{0.80} = 2.5 - 1.25 = 1.25\ m^{-1}$

$s_i = 0.80\ m$

For height, use $M = -\frac{s_i}{s_o} = -\frac{0.80}{0.80} = -1.0$

$M = \frac{h_i}{h_o}$ $\quad h_i = M h_o = -1.0 \times 0.20\ m$

$= -0.20\ m$

Chapter 18

Electrical Phenomena

Be ready to answer questions similar to the ones in the homework assignment, plus

18-45, 18-46.

Chapter 19

Electric field and Potential

Equations

$$F_e = k\frac{|q_1||q_2|}{r^2}$$

$$\boxed{k = 9.0\times10^9\ N\cdot m^2/C^2}$$

$$\boxed{e = 1.60\times10^{-19}\ C}$$

$$\boxed{\vec{F}_e = q\vec{E}}$$

$$E = k\frac{|q|}{r^2}\ ;\quad E = \frac{V}{d}$$

$$PE_e = k\frac{q_1 q_2}{r}\ ;$$

$$\boxed{PE_e = qV}$$

$$V = Ey$$

$$V = k\frac{Q}{r}$$

$$\boxed{V_{AB} = \frac{\Delta PE_e}{q}}$$

Problems

19-57, 19-66

19-54

19-55

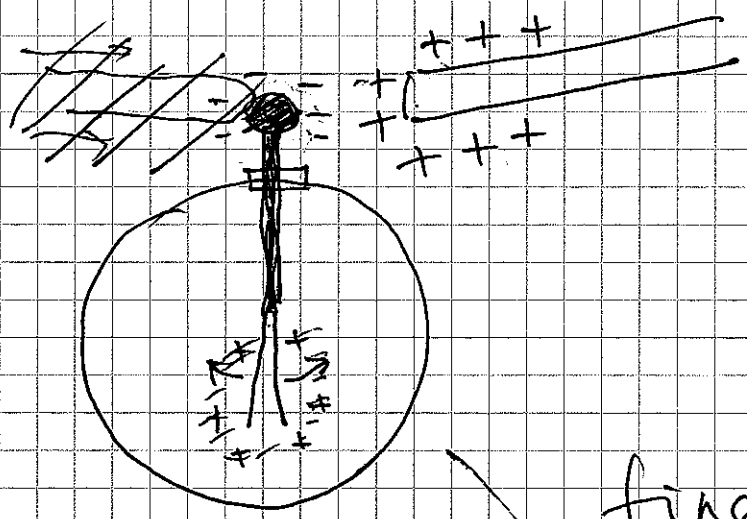
19-73

19-74

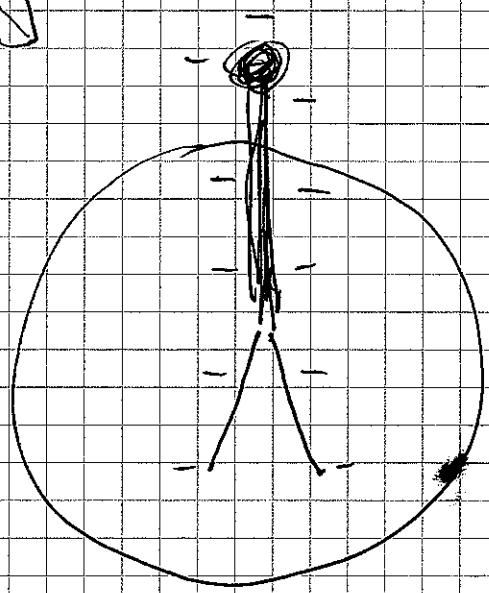
19-82

18-46

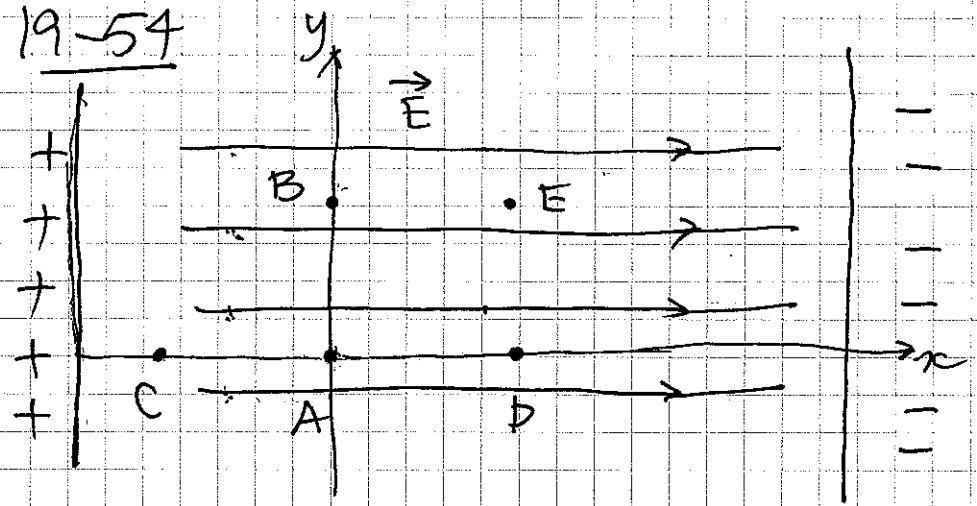
Charging by induction



final



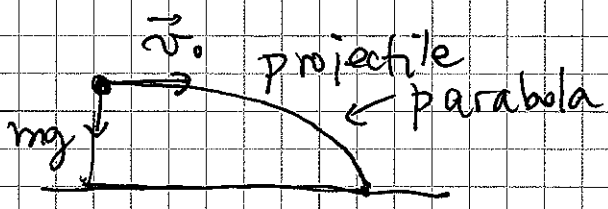
19-54



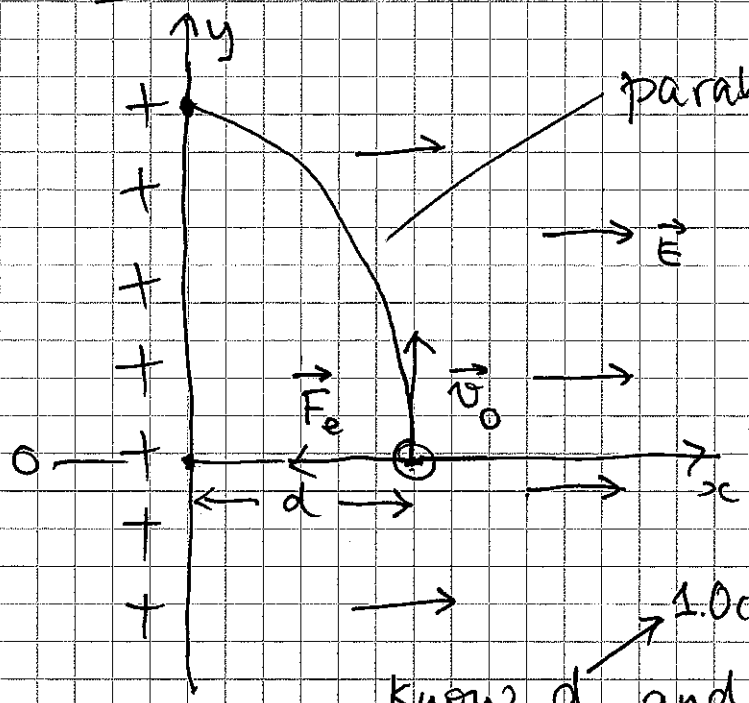
(a) All 5 points have the same electric field

(b) $V = Ey$

lowest		highest
E	B	
D	A	C



19-66 +



Force on electron

$\vec{F}_e = q\vec{E}$

$-e$

1.0 cm

Know d and $\vec{E} = 1000$ V/m to the right

Know $\vec{v} = 100$ m/s upward

Question: What (what y) does e hit the plate?

Part 1: Find the time it takes.

Along x: $x_0 = d$ $\quad x = 0$

$v_{0x} = 0$ m/s

$F_{net} = ma \rightarrow a = \frac{F_e}{m} = \frac{eE}{m_e} = \frac{(1.60\times10^{-19})(1000)}{(9.1\times10^{-31})} = \ldots$ to the left

$\Delta x = \cancel{v_0 t} + \frac{1}{2}at^2 \rightarrow$ find t.

Part 2: Find y distance covered in that time

Along y: $(a_y = 0)$ $\quad \Delta y = v_{0y}t$

$= (100)(\ldots)$