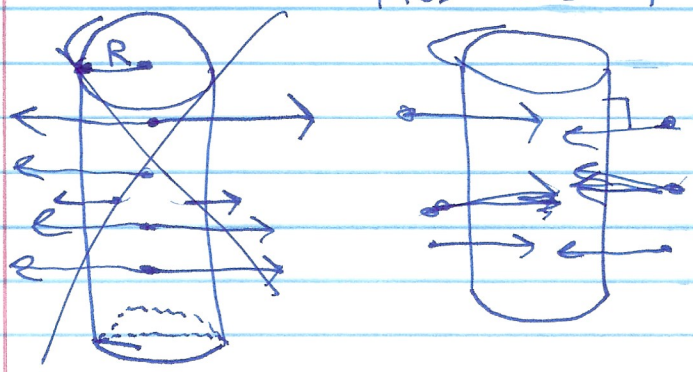
Physics Lab 7

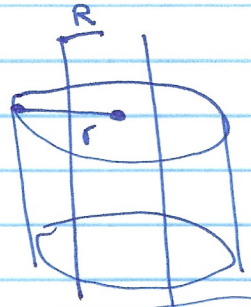
17 sep 2020

a.)



Flux through top/bottom = 0 because $L \to \infty$

b.)



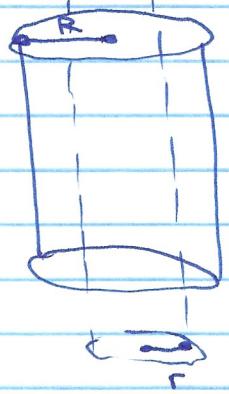
$$\oint E \, dA = \frac{q_{enc}}{\varepsilon_0} \rightarrow \frac{q_{enc}}{V} = \rho \quad \therefore \quad q = \rho V$$

$$q = \rho \pi R^2 l$$

$$EA = E 2\pi r l = \frac{\rho \pi R^2 l}{\varepsilon_0}$$

$$\vec{E} = \frac{\rho R^2}{\varepsilon_0 2r} \hat{r}$$

c.)



$$\oint E \, dA = \frac{q_{enc}}{\varepsilon_0}$$

$$q = \rho V = \rho \pi r^2 l$$

$$EA = \frac{\rho \pi r^2 l}{\varepsilon_0} = E 2\pi r l$$

$$\therefore \quad E = \frac{\rho r}{2\varepsilon_0}$$

d) $E_{in}(R) = \frac{\rho R}{2\varepsilon_0}$ $\qquad B_{out}(R)\, 2 \frac{\rho R^2}{\varepsilon_0 2R} = 0$

e.)