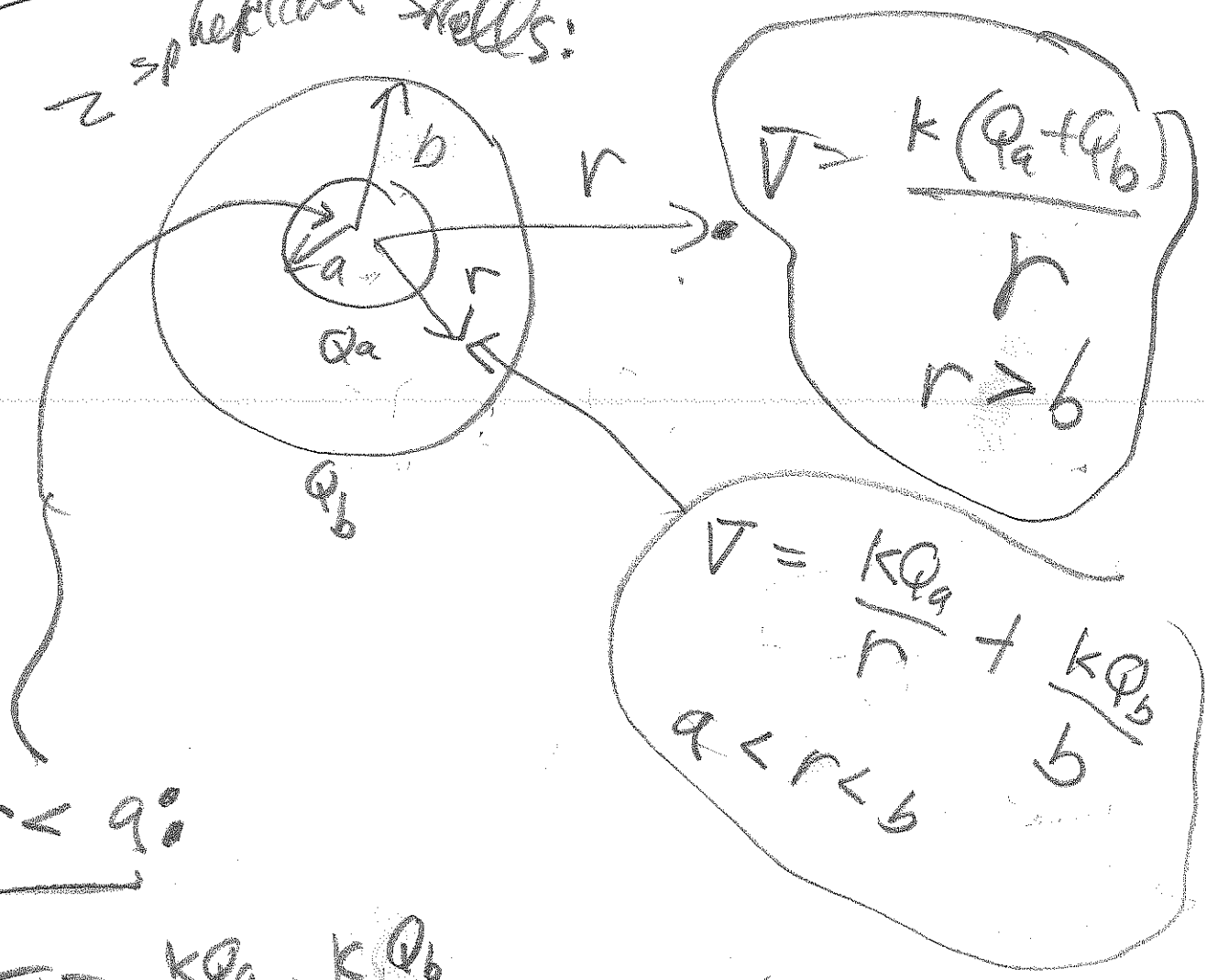
Physics 3-14-14

Ch24: comment on sample test 2 (#13)

2 spherical shells:



$0 < r < a$:

$$V = \frac{kQ_a}{a} + \frac{kQ_b}{b} = \text{constant}$$

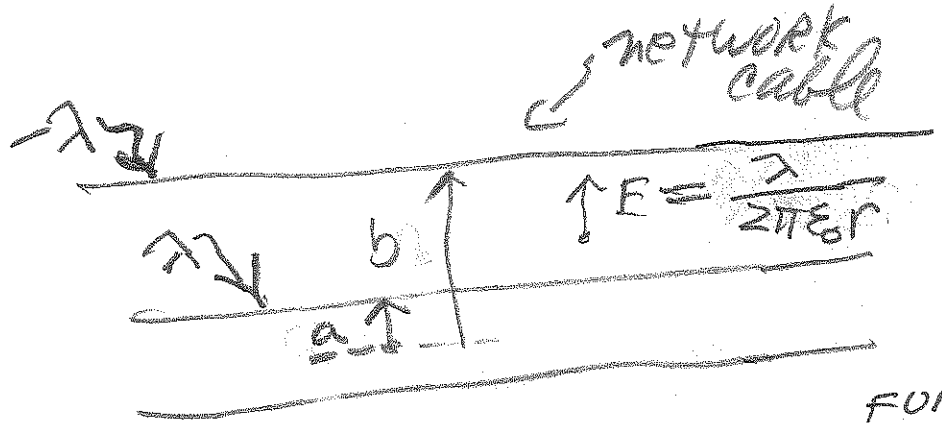
$(\vec{E} = 0)$

NOTE: IF $Q_a = -Q_b = Q$

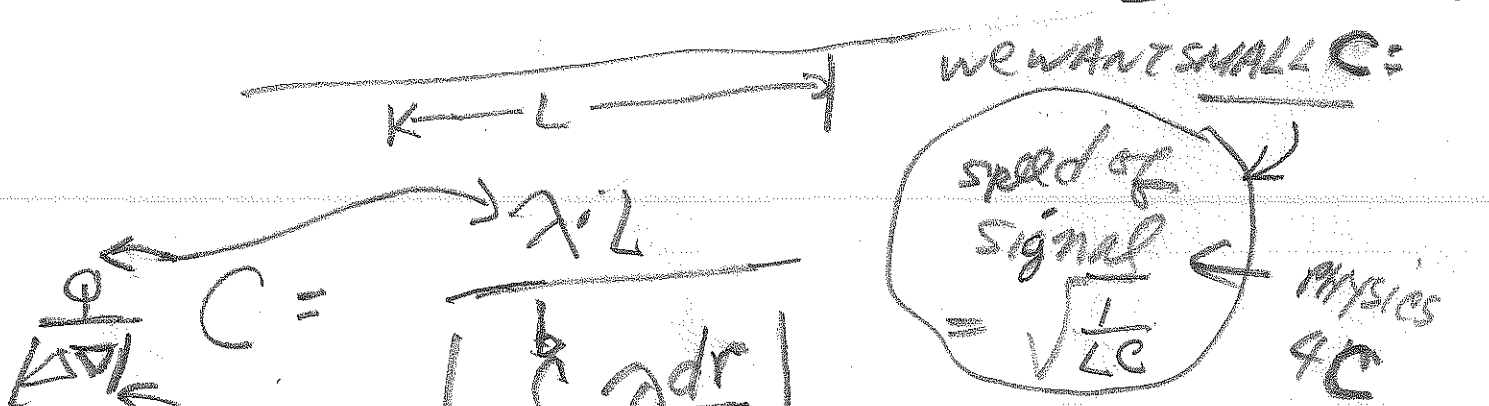
$$C = \frac{Q}{|\Delta V|} = \frac{Q}{kQ\left[\frac{1}{a} - \frac{1}{b}\right]}$$

$$C = \frac{ab}{k[b-a]}$$

10. Ch 24



FOR FAST NETWORKS, we want SMALL C:



$$C = \frac{2\pi\varepsilon_0 L}{\ln\frac{b}{a}}$$

$$a = 0.00250\text{ m} \Rightarrow 36.7\times10^{-12}\text{ F} = \frac{2\pi\varepsilon_0 L}{\ln\frac{b}{a}}$$

(a) find b

(b) $\Delta V = 125\text{ V} = \frac{\lambda}{2\pi\varepsilon_0}\ln\frac{b}{a}$

find λ.