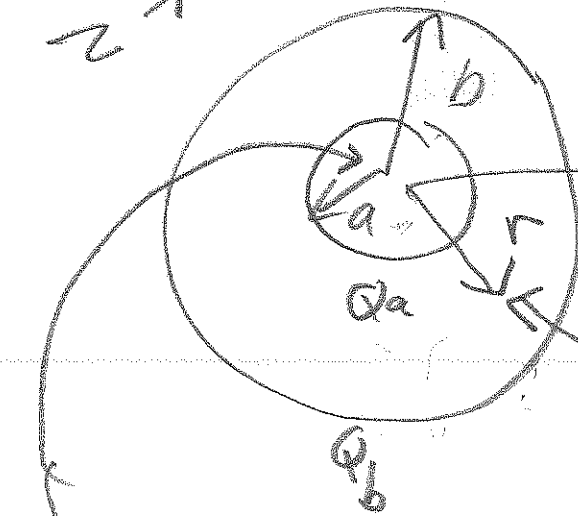


Phy 4B 3-14-14

(1)

ch 24: comment on sample test 2  
(MAIN)

2 spherical shells:



$$V = \frac{k(Q_a + Q_b)}{r} \quad r > b$$

$$V = \frac{kQ_a}{r} + \frac{kQ_b}{b} \quad a < r < b$$

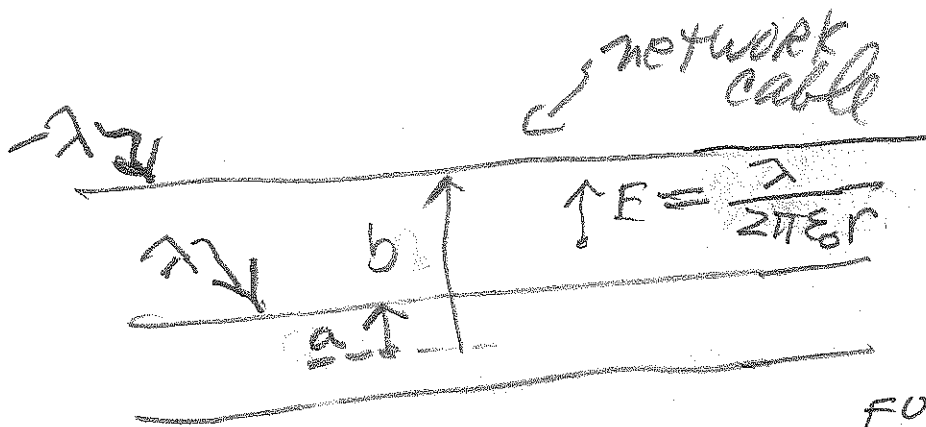
$0 < r < a$ :

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

( $\vec{E} = 0$ ) Note: IF  $Q_a = -Q_b = Q$

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

10. CH 24



FOR FAST NETWORKS,

WE WANT SMALL C:

speed of signal  
 $= \sqrt{\frac{1}{LC}}$

PHYSICS  
 4C

$$C = \frac{\lambda L}{\int_a^b \frac{\lambda dr}{2\pi \epsilon_0 r}}$$

$$= \frac{\lambda L}{2\pi \epsilon_0 \ln \frac{b}{a}}$$

$$\frac{\lambda}{2\pi \epsilon_0} \ln \frac{b}{a}$$

PF  
 $-12 = \frac{2\pi \epsilon_0 L}{\ln \frac{b}{a}}$

$$q = 0.00250 \text{ m} \Rightarrow 36.7 \times 10^{-12} \text{ F} = \frac{2\pi \epsilon_0 L}{\ln \frac{b}{a}}$$

→ (a) find b

(b)  $\Delta V = 125 \text{ (V)} = \frac{\lambda}{2\pi \epsilon_0} \ln \frac{b}{a}$   
 find  $\lambda$ .