CH 20 sample test 2

TURN IN: 9, 16, 31, 78,

FORCE ← MOTION W/ FORCE ← FORCE ON WIRE

34, 50, 53, 67, 82, 71

3-14-12

Sec 20.10 Sec 20.10

TORQUE

FIELD OF A LONG WIRE

FORCE between 2 II WIRES

LOOPS, SOLENOIDS

YOU ARE RESPONSIBLE FOR: #9, 16, 31, 78, 34*, 50*

* MORE REVIEW

3-17-14 Start-up:

(53) I_1 I_2 F_E

$I_1 = 25$ (A)

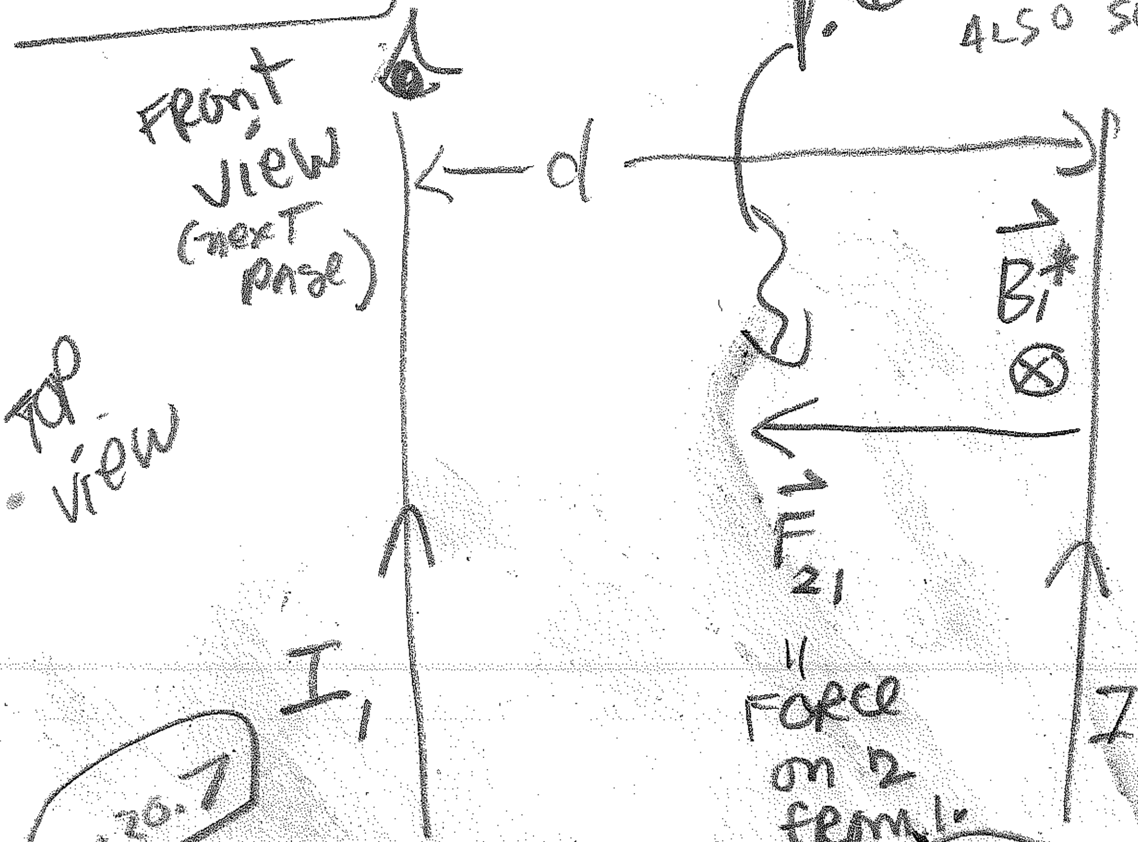
$I_2 = 75$ (A)

53

2B — 3-14-14

p. 671: sec 20.5
ALSO sec 20.10

⊗ IN   ⊙ OUT



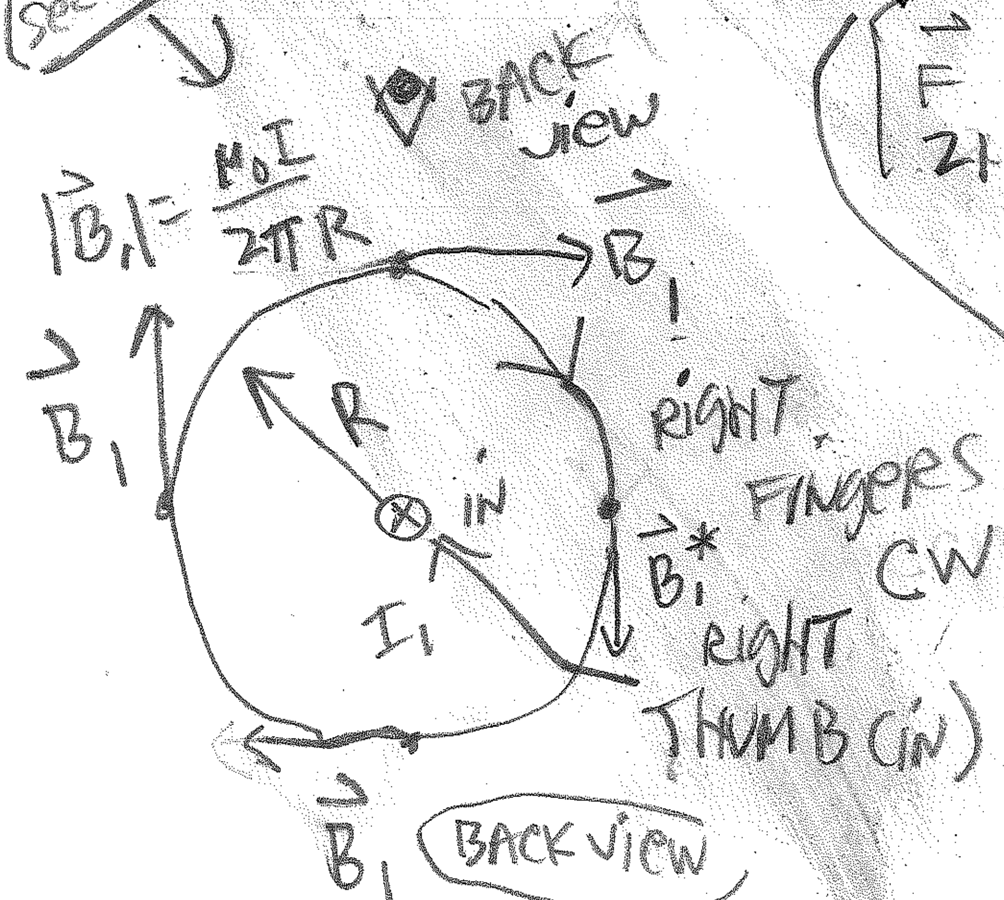
$$\left|\vec{F}_{21}\right| = I_2 \cdot L_2 \cdot B_1 \sin 90^\circ$$

$$= I_2 L_2 \left(\frac{\mu_0 I_1}{2\pi d}\right) \cdot 1$$

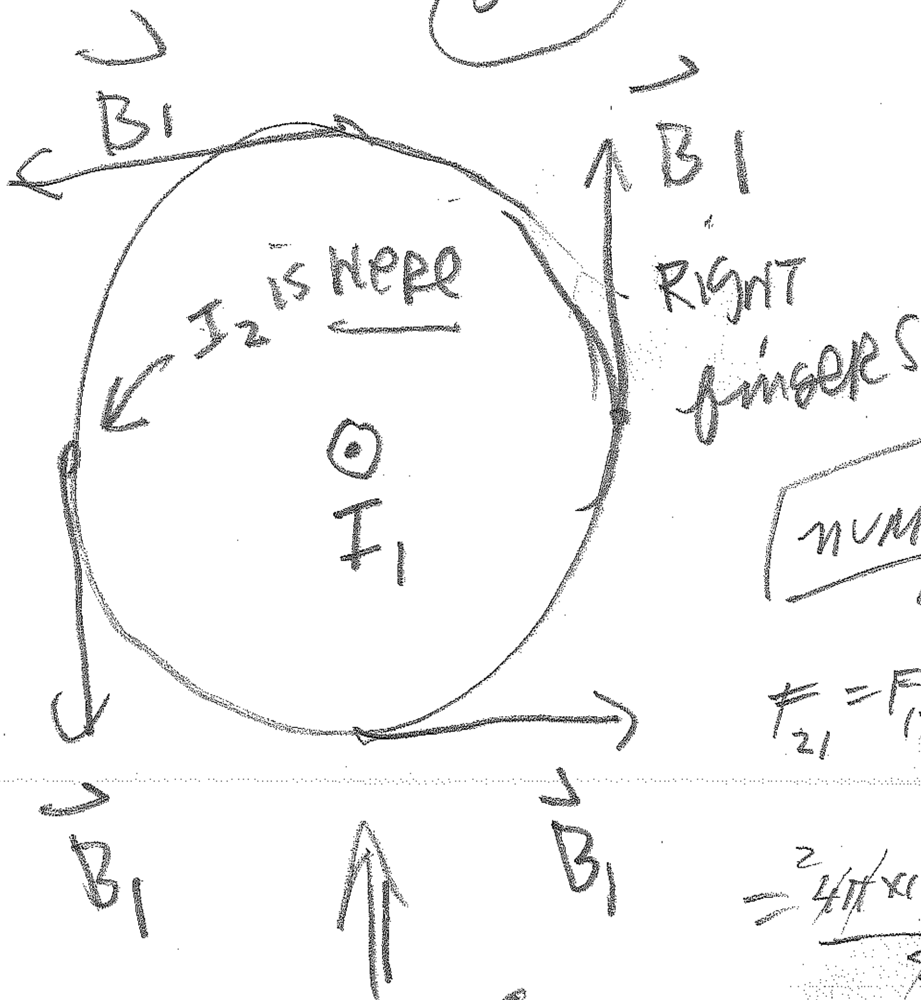
$$\frac{\mu_0 I_2 L_2 I_1}{2\pi d}$$

sec 20.7

$$|\vec{B}_1| = \frac{\mu_0 I}{2\pi R}$$



(5 3.)



front view

NUMBERS

$\mu_0 = 4\pi\times10^{-7}$ (units)

$$F_{21} = F_{12} = \frac{\mu_0 I_2 L_2 I_1}{2\pi d}$$

$$= \frac{4\pi\times10^{-7}\cdot(75)(15)(25)}{2\pi\cdot(0.35)}$$

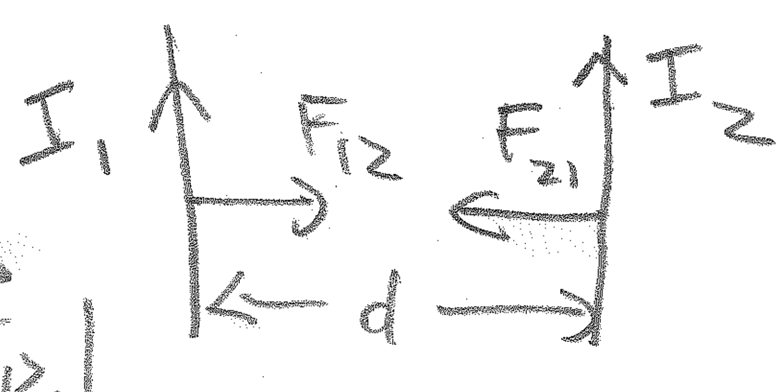
$$= \frac{2\times10^{-7}(15)(75)(25)}{(0.35)} = 1.6\times10^{5}\times10^{-7}$$

$$1.6\times10^{-2}\ (N)$$

Note: $\vec{F}_{12} = -\vec{F}_{21}$

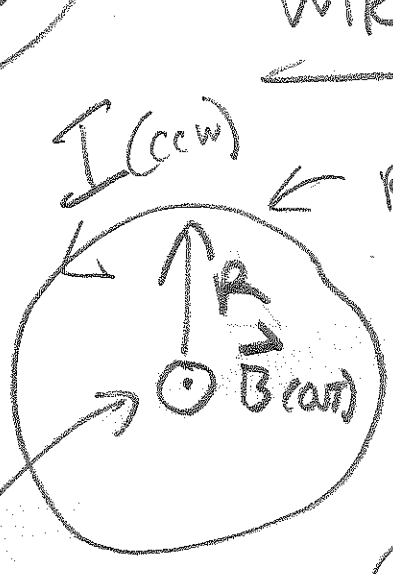
$F_{12} = F_{21}$

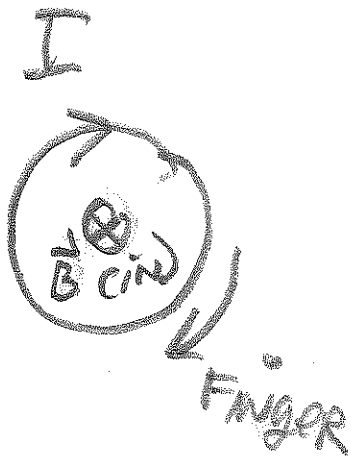
$= |\vec{F}_{21}| = |-\vec{F}_{12}|$



Sec 20.4

(6) WIRE LOOP



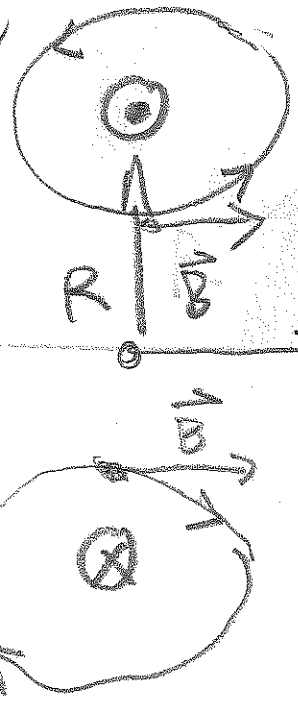


ccw

(a) $B_{AXIS} = \frac{\mu_0 I}{2R}$ $\theta \rightarrow \vec{B}_{AXIS}$

(b) N-LOOPS, $\vec{B}$, I, AXIS $B = \frac{\mu_0 NI}{2R}$

side view



$$|\vec{B}_{AXIS}| = \frac{\mu_0 I}{2R}$$

see fig 20.7 (c)

(67.) numbers

a. $B = \frac{(4\pi \times 10^{-7})(2)}{(2)(0.10)}$ ← single loop ($N = 1$).

$= \frac{4\pi}{(0.10)} \times 10^{-7}$

$= 4\pi \times 10^{-6}\ (T)$

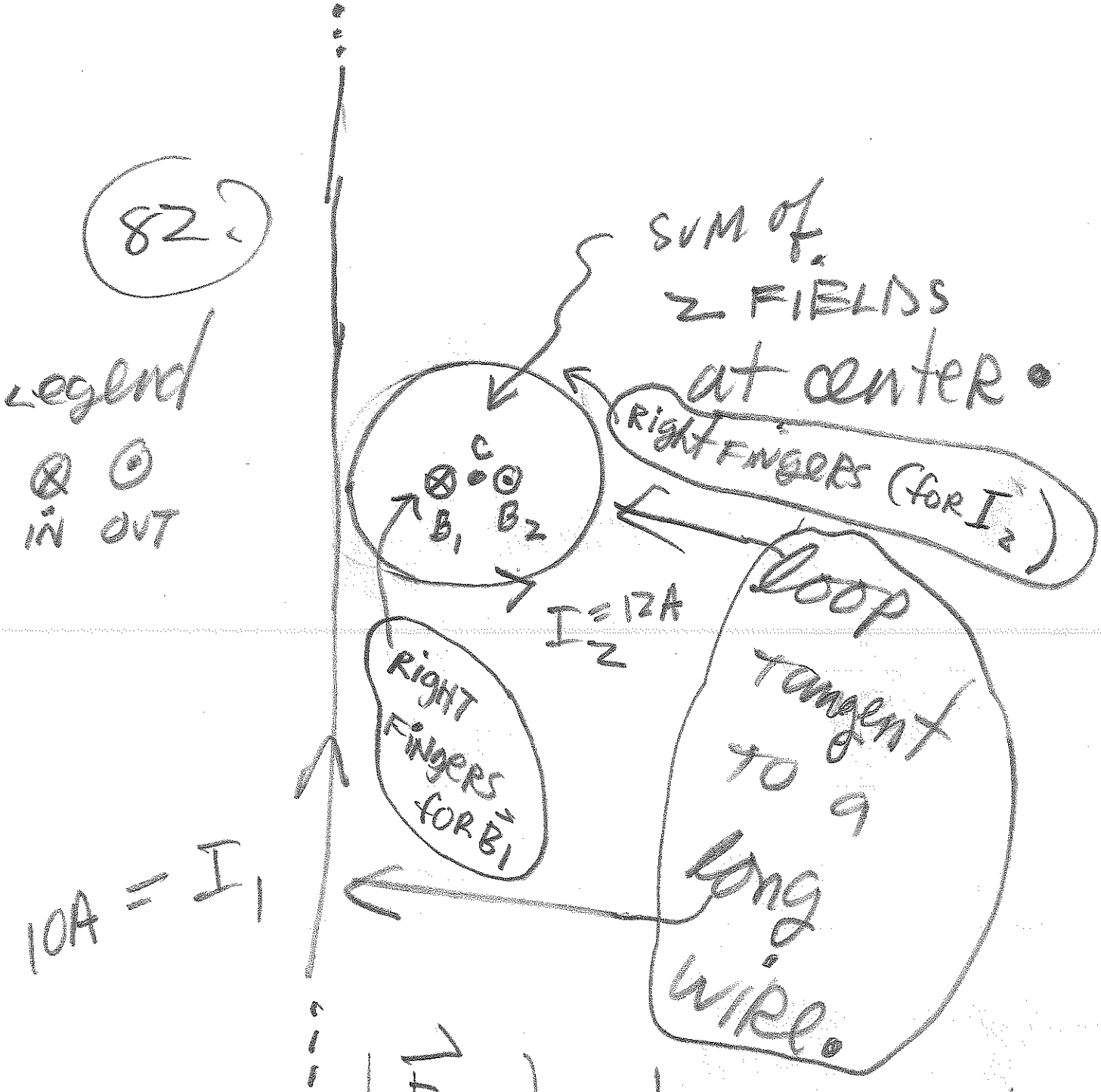
↑ TESLA

b. $B_{(b)} = N \cdot B_{(a)}$

solenoid IN CAR-STARTER

N-loops

(82.)



$$\left|\vec{B}_{SUM}\right| = \left|B_{WIRE} - B_{LOOP}\right|$$

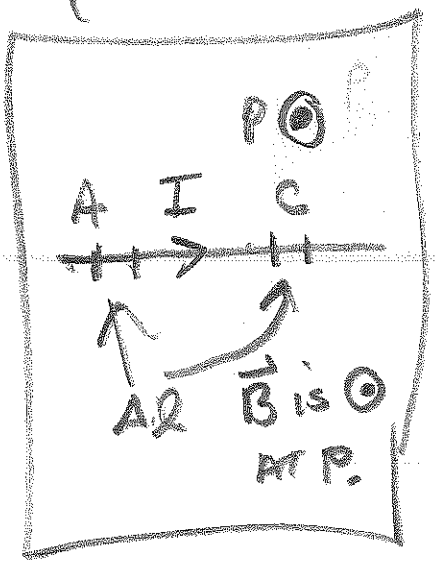
$$\frac{\mu_0 I_2}{2R} - \frac{\mu_0 I_1}{2\pi R} = B_{SUM} = \left|\frac{\mu_0 I_1}{2\pi R} - \frac{\mu_0 I_2}{2R}\right|$$

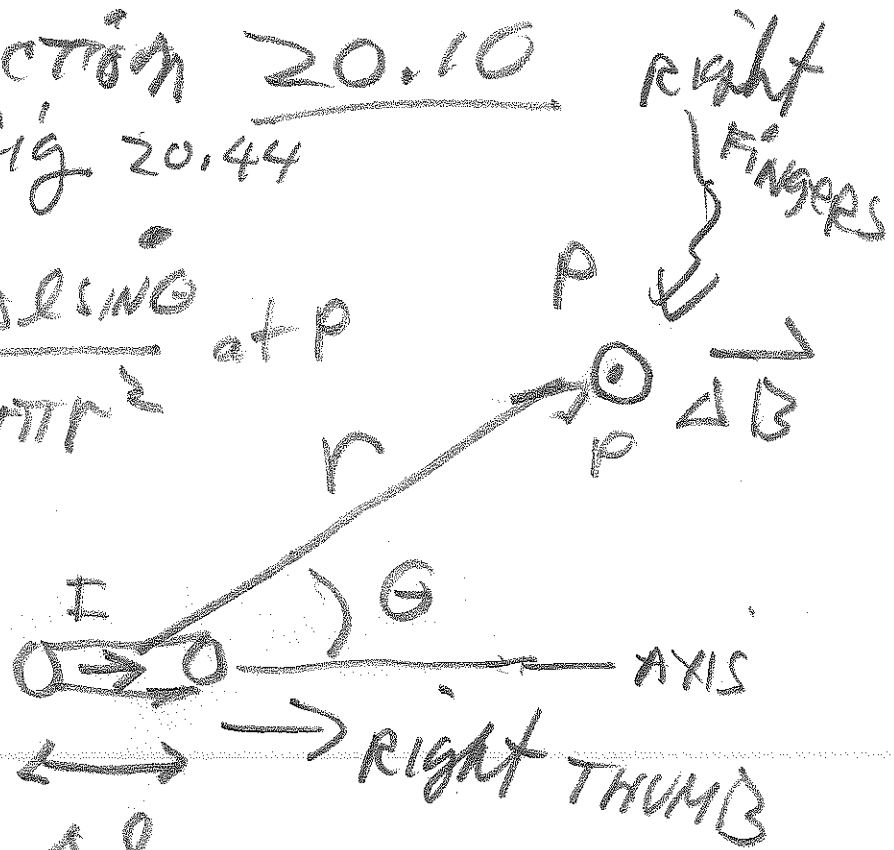
Section 20.10

fig 20.44

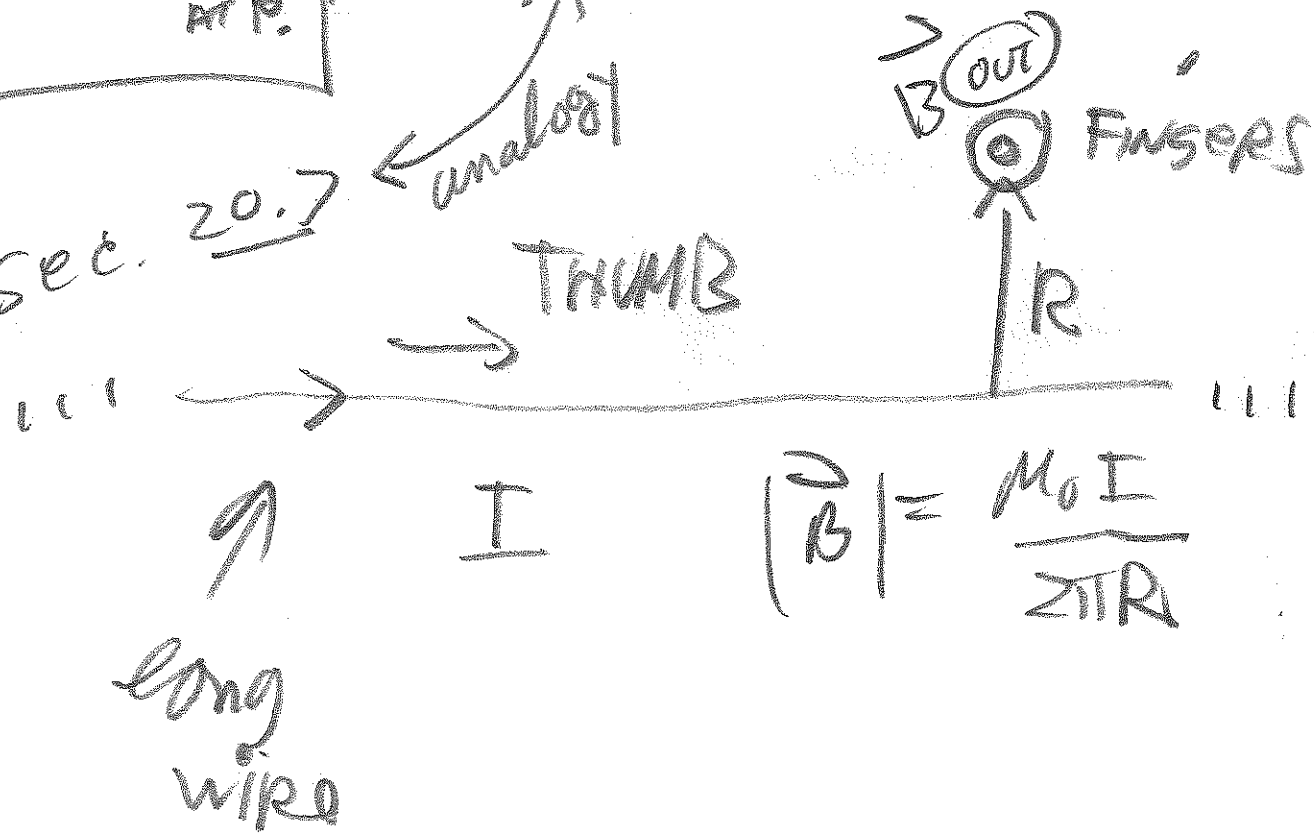
(11.)

$$|\Delta \vec{B}| = \frac{\mu_0 I \Delta \ell \sin\theta}{4\pi r^2} \text{ at } P$$





unload Sec. 20.7



$$|\vec{B}| = \frac{\mu_0 I}{2\pi R}$$

RC lab – addendum

HINT

#6)

$$\ln\left(V_0 e^{-t/RC}\right)$$

$$= \ln V_0 + \ln\left(e^{-t/RC}\right)$$

$$\ln V = \ln V_0 - \frac{t}{RC}$$