5-9-14 #13

TEST4 "Masterlink"

5-5-14

Links to ch 28, 29

+ examples worked

from ch 29.

ch28, 29 review: sample

EXAMS from previous

years mapped* to

Quiz 28, Quiz 29

* you can do this

mentally

Ch 28: 3-24, 3-28, 4-21, 4-25, 4-9

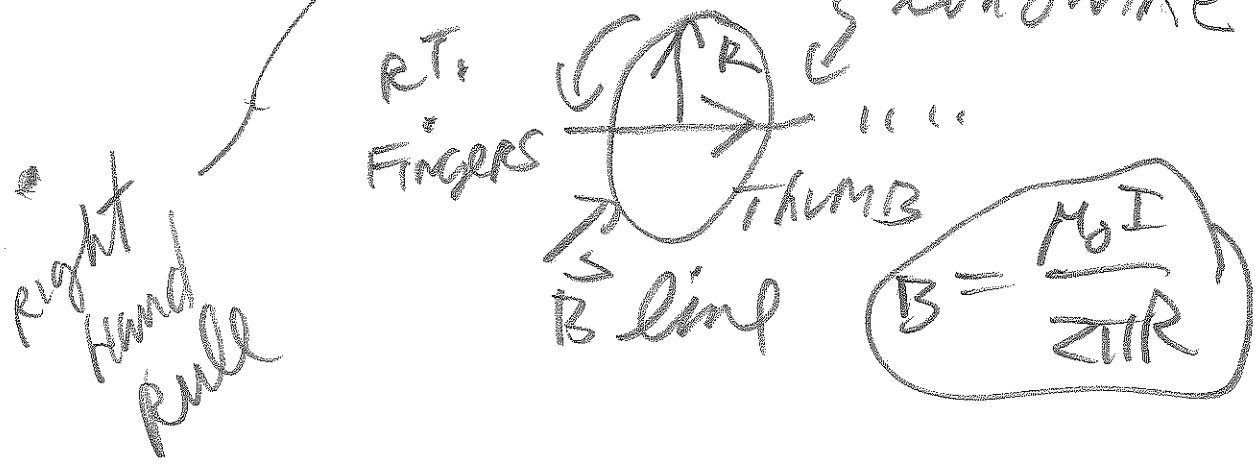
Link

comments

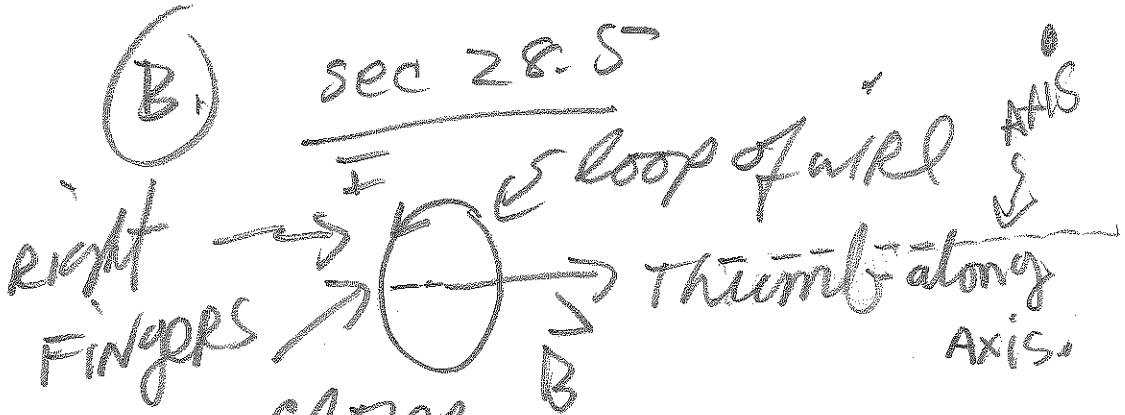
3-24

(A) R.H.R long wire & long wire

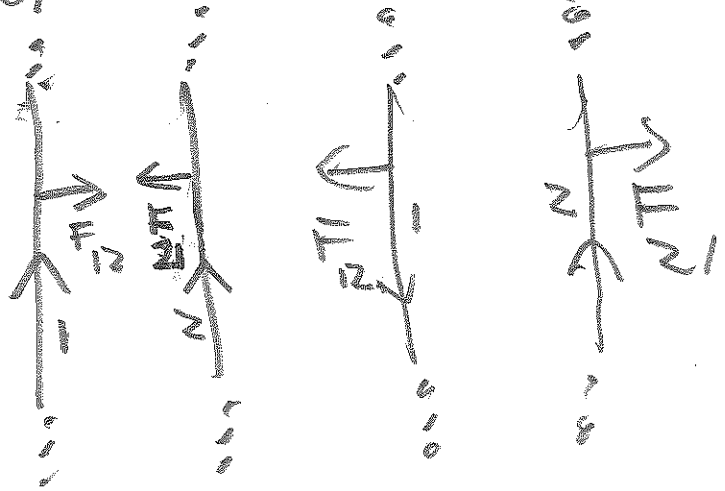
Eq 28.5
Eq 28.9



(B) sec 28.5



(C)



Link (Date)

3-28

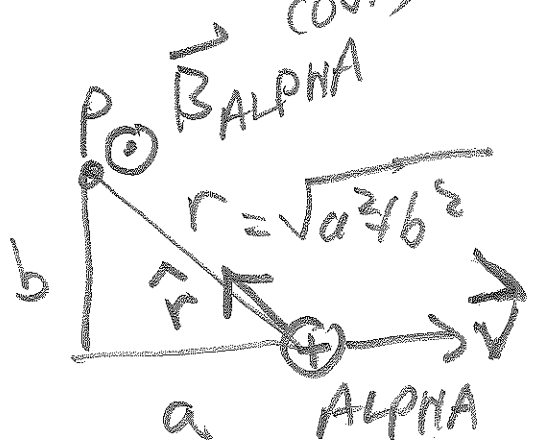
comment

$B = \mu_0 n \cdot I$

solenoid

4-21

#28.4



$$B = \frac{\mu_0 q v \sin 140^\circ}{4\pi (a^2+b^2)}$$

Date

comment

(4

4-21

$\vec{B} = \frac{\mu_0 q \vec{v} \times \hat{r}}{4\pi r^2}$

$q < 0$

IN

$|\vec{B}| = \frac{\mu_0 |q| v \sin 90^\circ}{4\pi (5\times10^{-9}\,m)^2}$

#28.8

$\vec{B}_e$ (IN)

$\vec{v}$ ⊗ $q = -e$

90°

$\hat{r}$

5nm

observation pt.

$d\vec{B} \propto \frac{d\vec{l} \times \hat{r}}{s^2} = 0$

$d\vec{l}$

$\hat{r}$

#28.30

$d\vec{l}$ ← ARC

straight = s

I

I

$\hat{r}$

R

B (IN)

$|d\vec{B}| = \frac{\mu_0 I\, dl}{4\pi R^2}$

ARC

$d\vec{l}$

$\hat{r}$

$B = \frac{\mu_0}{4\pi} \frac{I}{R^2} \int dl$

$\pi \cdot R$

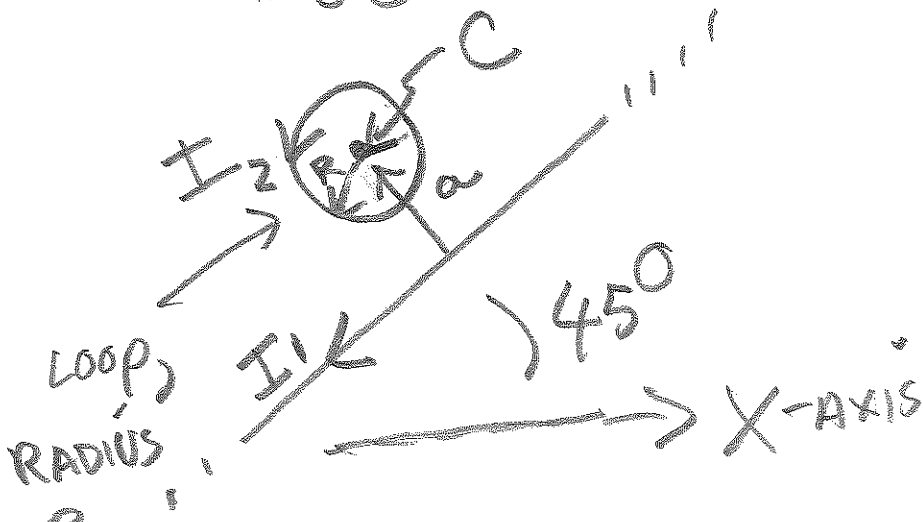
Date
4-21

comment

#28.80

FIND
→ B direction
at C.

Modification of #80:



at C:

set $B_{net_C} = 0 = \frac{\mu_0 I_1}{2\pi a} - \frac{\mu_0 I_2}{2R}$

$\rightarrow I_1 = \frac{\pi}{R} \cdot I_2$

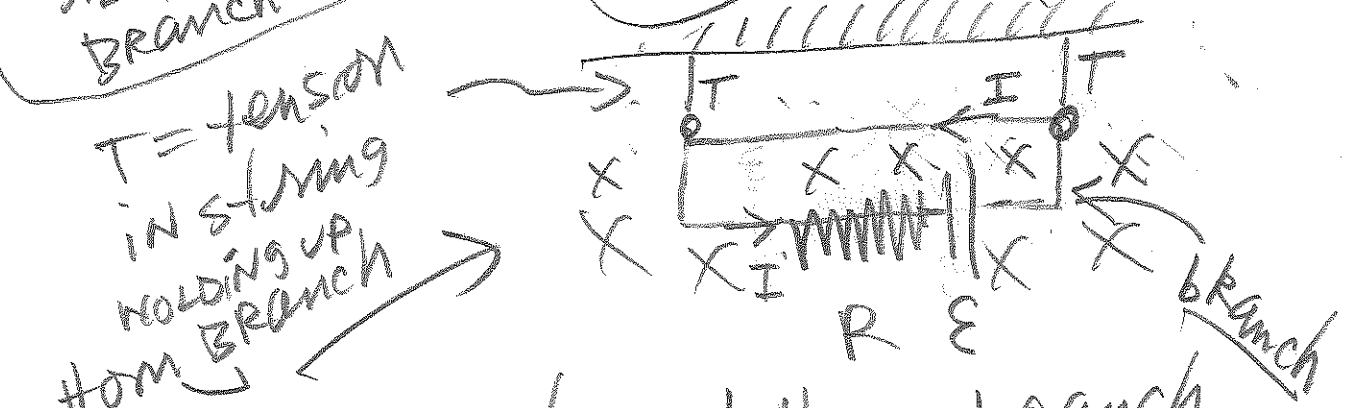
Date	comments
4-21	read Theory as in ALL LINKS TO Ch 28

4-25 ch 28 #71., #72.

#70

TOP SIDE BRANCH mass = 0

#71 analog:



B only acts on bottom branch.

WIRE BRANCH HAS mass m.

FIND I SUCH that $T = 0$

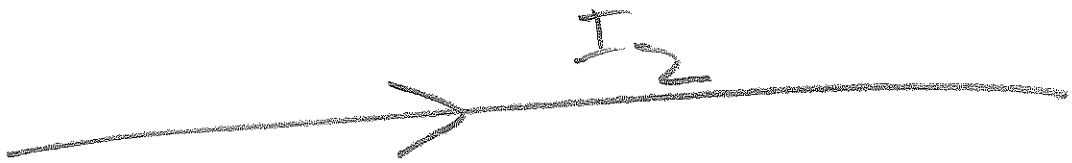
$\Sigma F_y = ILB + T - mg = 0$

$\rightarrow$ $ILB = mg$

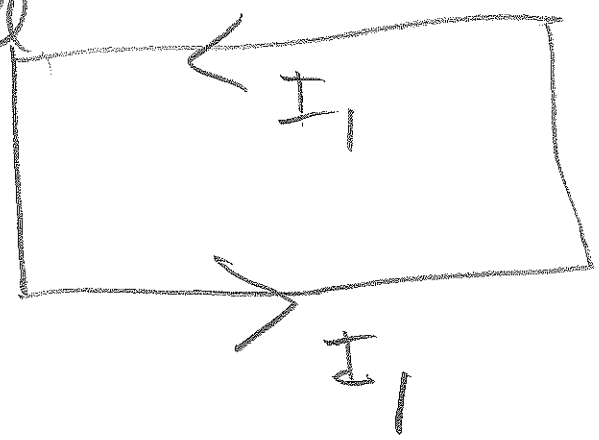
I to right in bottom branch

4-25 | comment

#72 change up?



net force on electrons would be repulsive

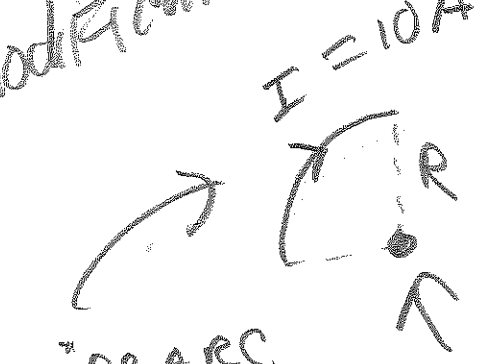


4-25

comment

ch28

(Re.) modification



wire arc $\frac{1}{4}$ circle.

radius = 1m.

FIND $\vec{B}$ at center.

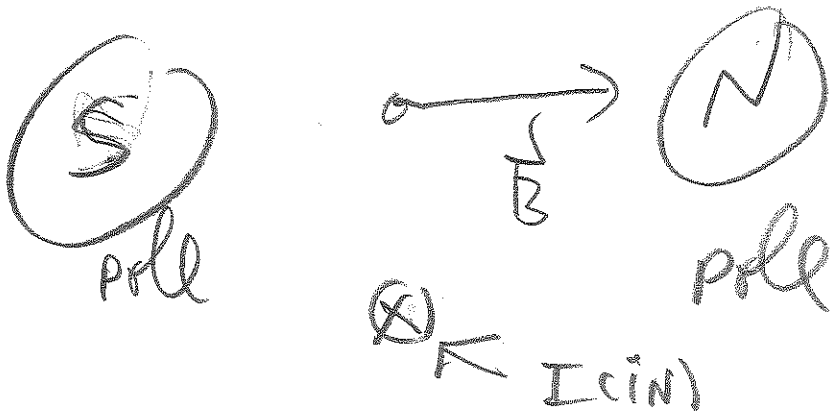
$\vec{B}$ IN

$$|\vec{B}| = \frac{1}{4} \cdot \left(\frac{\mu_0 I}{2R}\right)$$

$$= \frac{\mu_0 I}{8R}$$

Mistake 4-25-14Real.pdf

I (OUT) ⊙ ← correct direction (OUT) ← corrected



Date	CH 28	comment
4-9-14		$\frac{\mu_0}{4\pi} \cdot \frac{\vec{v} \times \vec{B}}{r^2}$ CH 28 Example 1

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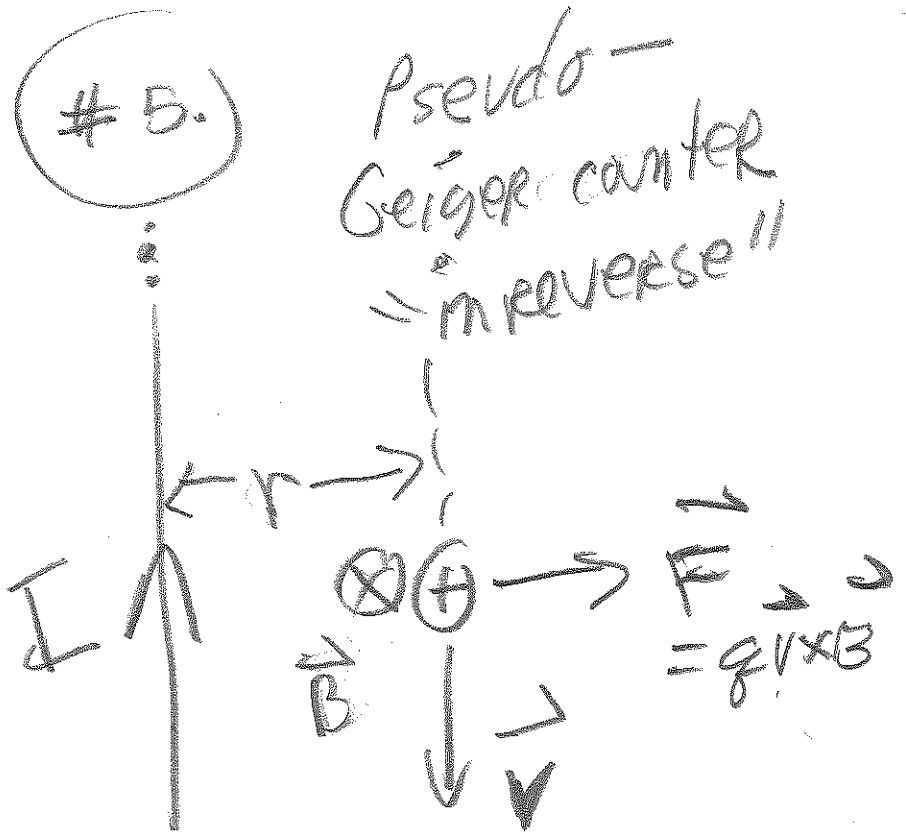
SAMPLEFINAL

PAGE 1 (#5.)

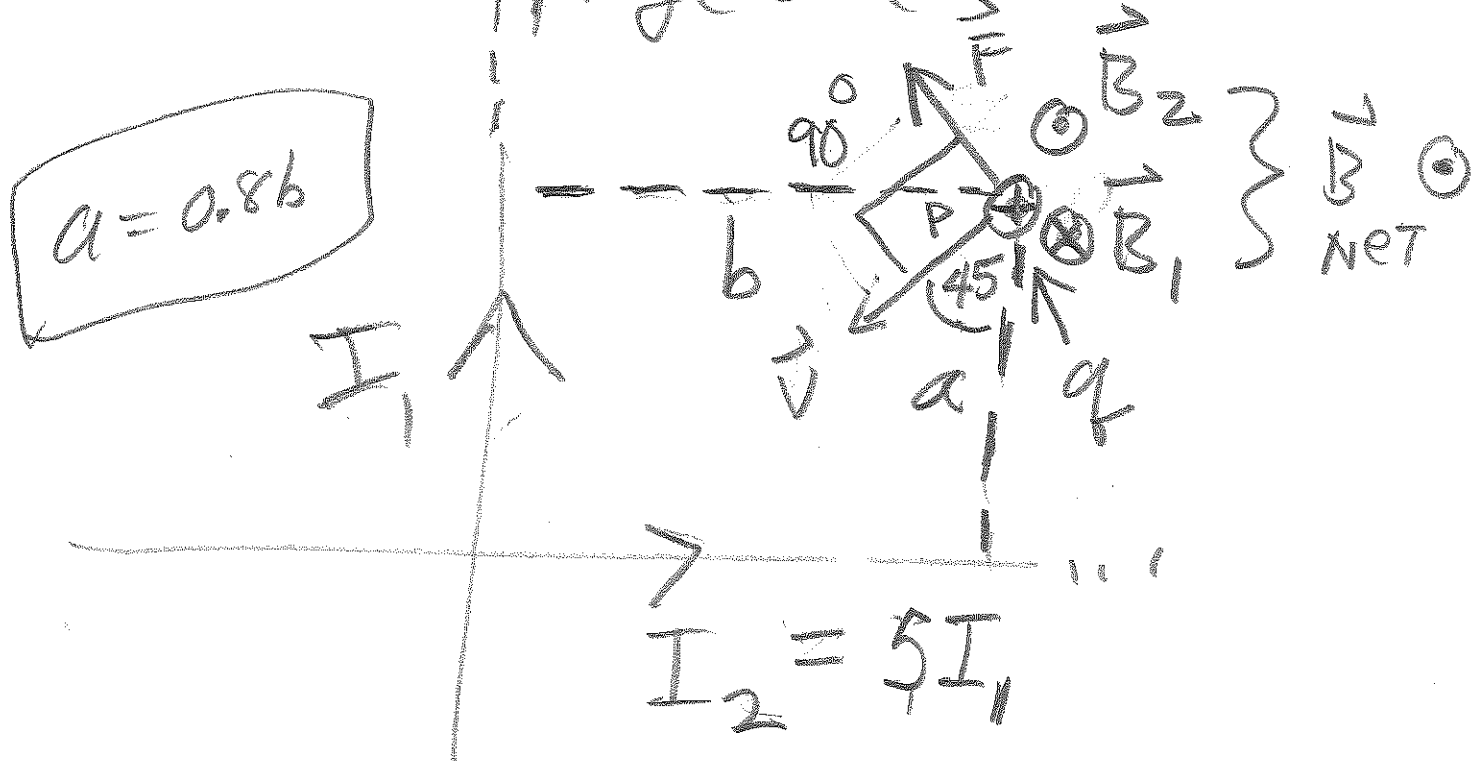


$$|\vec{F}| = qvB\sin 90$$

$$= qvB = \frac{qv\mu_0 I}{2\pi r}$$

What if modification of #5, (FINAL)

page one...



$\vec{F}$ direction on q at P

$F = |q|vB_{net}$

$F = |\vec{F}|$

$B_{net} = \frac{\mu_0}{2\pi}\left(\frac{I_2}{a} - \frac{I_1}{b}\right)$

B_{net} is out ⊙

PAGE 1 (#6.) — (CH 29)

$|\vec{B}|$ increasing

(a.) CW

$|\vec{B}|$ increases

(b.) $|\mathcal{E}| = N \left| \frac{d\Phi_B}{dt} \right|$

$B = 0.03t^2 + 0.04t + 1.4$ $= N \cdot A \left| \frac{dB}{dt} \right|$

$N = 1 \Rightarrow |\mathcal{E}| = \pi r^2 \cdot [0.06t + 0.04]$

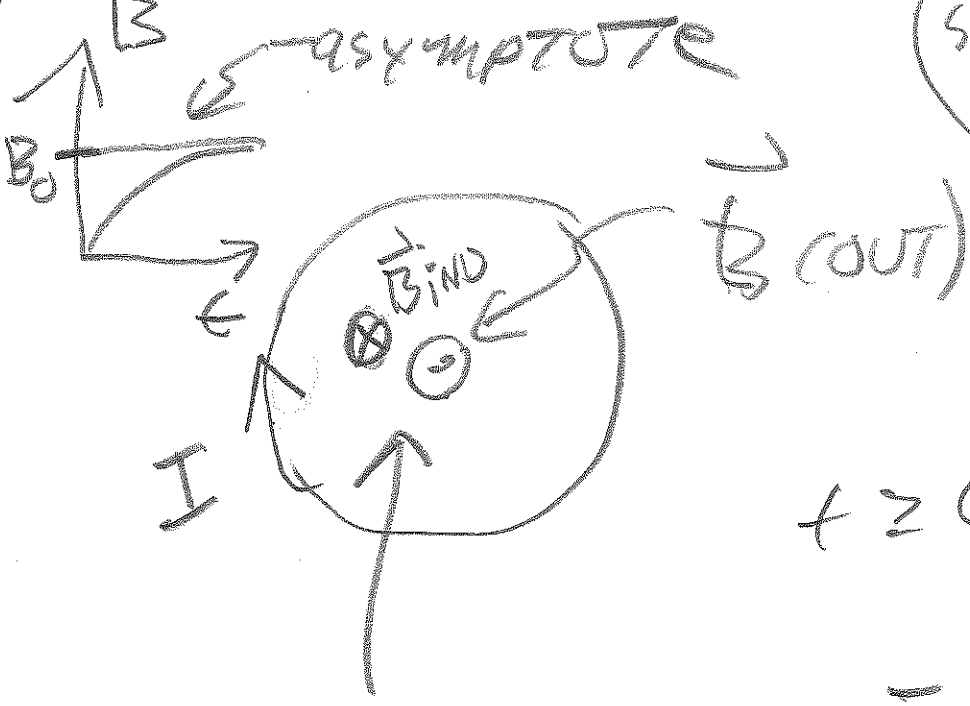
differentiate

calculus: $\frac{dCx^n}{dx} = n \cdot C \cdot x^{n-1}$

#6 PAGE one, SFINAL, (1)

MODIFICATION: sample final

a)



$t \geq 0$

$$|\vec{B}| = B = B_0\left(1 - e^{-t/\tau}\right)$$

B increases

$\vec{B}_{IND}$ parallel to $\vec{B}$ only when $|\vec{B}|$ INCREASES

$$|\mathcal{E}|^{(N=1)} = \pi r^2 \cdot \left|\frac{dB}{dt}\right| = \pi r^2 \frac{B_0}{\tau} e^{-t/\tau}$$

(b.) $I = \frac{\pi r^2}{R} \cdot [0.06\tau + 0.04]$ (ORIGINAL)

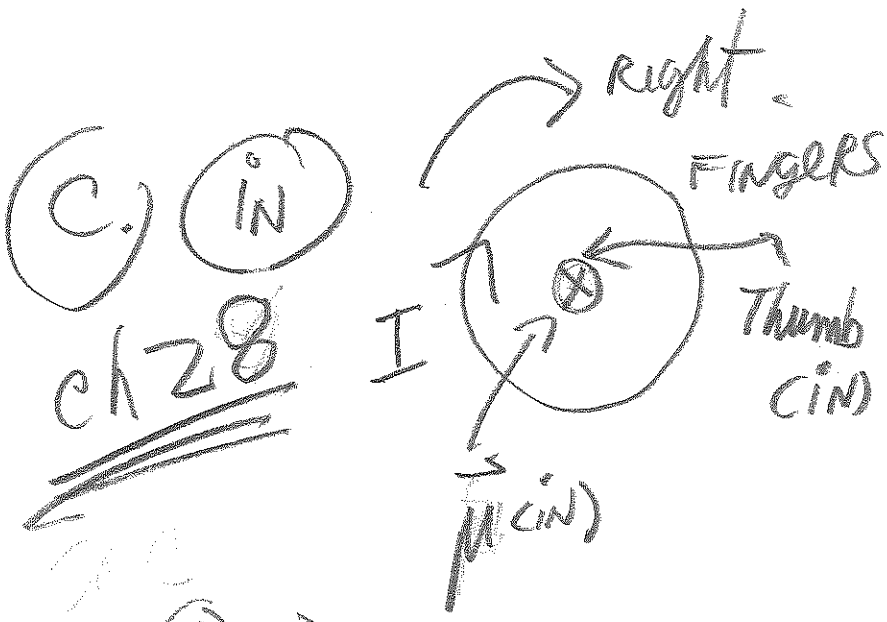
$I = \frac{|\mathcal{E}|}{R}$ (14)

$R = 2\Omega$.

$I = \frac{\pi r^2 \cdot B_0/\tau e^{-t/\tau}}{R}$ (MODIFICATION)

(c.) (IN)

ch 28

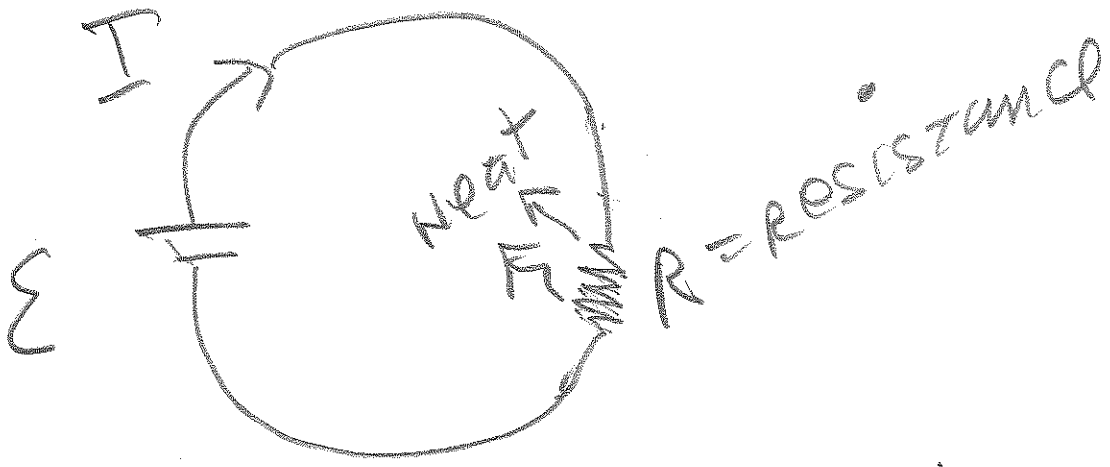


SECTION 28.5

$\vec{\mu}$ is in SAME DIRECTION AS $\vec{B}_{IND}$ ON AXIS.

NOT $\vec{B}$.

(d.) $|\vec{\mu}| = I \cdot \text{area}$



$$|\mathcal{E}| = I = \frac{|\mathcal{E}|}{R}$$

$$= \frac{\pi r^2}{R}\left[0.06t + 0.04\right]$$

OR

$$= \frac{\pi r^2 \cdot B_0}{2 \cdot R} e^{-t/\tau}$$

plug-in t.