pe-22 - Ampere Law version A

(1) $\oint dl$ circle of radius $4.7\,m = r$

$\oint dl = 2\pi r = 2(\pi)(4.7) = \boxed{29.53\,m}$

(2) $\int \vec{H} \cdot d\vec{l} = I = 2\pi r H = I$

$H = \frac{I}{2\pi r} = \frac{8.5 \text{ amps}}{(2)(\pi)(4.7 \text{ meters})}$

~~6.38 A/m~~

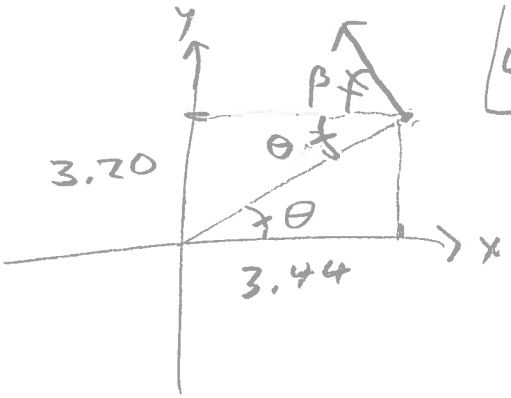
(3) $= \boxed{.2878 \text{ amp/meter}}$

(4) $r = \sqrt{3.4389^2 + 3.2037^2} = 4.69997$

$\simeq 4.700$

$H = \frac{I}{2\pi r} = \frac{8.5}{2\pi(4.7)} = \boxed{.2878 \text{ A/m}}$???

true, but not what was asked



want y-component.

$H_y = -H\sin\beta$

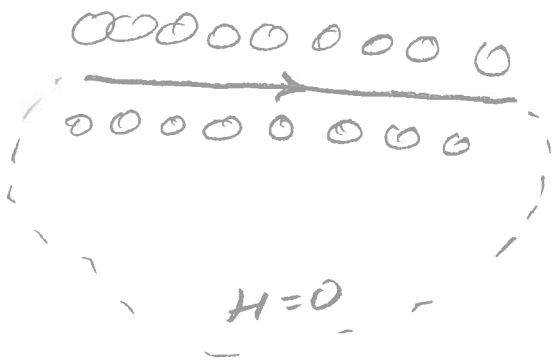
$= +H\cos\theta$

$= (H)\frac{3.4389}{4.6997}$

$= \boxed{.2106 \text{ A/m}}$ yes

(5) First find H

$$\oint H \cdot dl = NI \qquad N = \#\text{turns}$$



140 m long
1331 turns
8.5 Amps

$$\oint H \cdot dl = (H)(\text{length}) = H(140) = (1331)(8.5)$$

$$H = \frac{(1331)(8.5)}{140}$$

But $B = \mu_0 H$

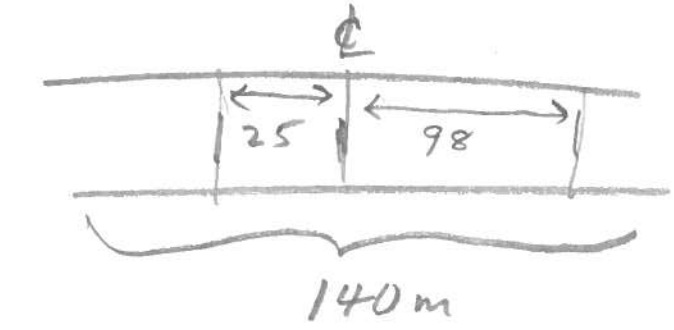
$\mu_0 = 4\pi \times 10^{-7}$

$$\mu_0 H = \frac{(1331)(9.6)(4\pi)}{140} \times 10^{-7} = B$$

$$B = .000115 = 1.15 \times 10^{-4} \text{ Tesla}$$

(6) Same as before except that we don't know if the path

(6)



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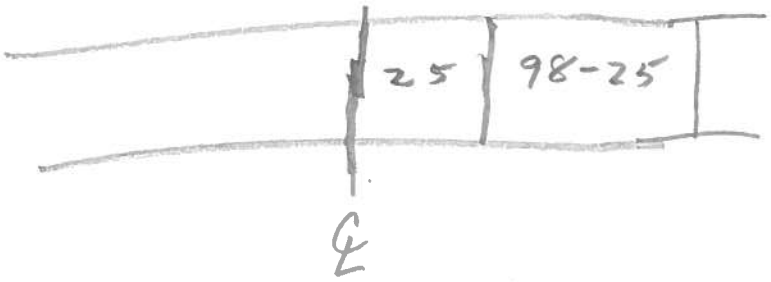

Does path include ~~edge~~ center?

$\oint H \cdot dl = H(98+25)$ if yes
$H(98-25)$ if no

$H = \dfrac{(1770 \text{ turns})(9.6 \text{ Amps})}{140 \text{ meters}}$ since $\oint H \cdot dl = IN$

$= 121.37$ A/m

$98 + 25$

$\oint dl = 123 = 98+25$ if yes
$= 73 = 98-25$ if no.

$H \oint dl = 121.37(123) = 1.49E4$ if Yes
$H \oint dl = 121.37(73) = 8.86E3$ if No

BOTH ARE WRONG