PHY 112 - SQ-02 ID: 19101077

Section - 04

Here,

$N = 38$

$l = 11\,cm = 0.11\,m$

$h = 10\,cm = 0.1\,m$

$\theta = 53^\circ$

$i = 8\,mA = 0.008\,A$

a) $\mu = NiA$

$= 3.344 \times 10^{-3}$

$x = -\mu \sin\theta = -0.002671\,m$

$= 0.002671\,cm$ (Ans)

$y = \mu \cos\theta = 0.002635\,1\,m$

$= 0.26351\,cm$

(Ans)

b) Here $\vec{\tau} = \mu \vec{B}$

$$= \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ -2.67\times10^{-3} & 2.63\times10^{-3} & 0 \\ 7 & 6 & 9 \end{vmatrix}$$

$$= +0.02367\,\hat{i} - 0.02403\,\hat{j} + 0.03442\,\hat{k}$$

c) $U = (\vec{\mu} \cdot \vec{B})$

$= -(2.67\times10^{-3}\hat{i} + 2.63\times10^{-3}\hat{j})(7\hat{i} + 6\hat{j} + 9\hat{k})$

$= -3.4\times10^{-2}$

d) $B = \dfrac{\mu_0 I}{2\pi}$ | $I = 0\times A$ =

$= \dfrac{4\pi\times10^{-7}\times}{2\times38}$