

$$\vec{B} = (3 \mu\text{T}) \hat{j} + (10 \mu\text{T}) \hat{k}$$

$$I = 0,5 \text{ A} \quad \vec{\ell} = (0,5 \text{ m}) \hat{i}$$

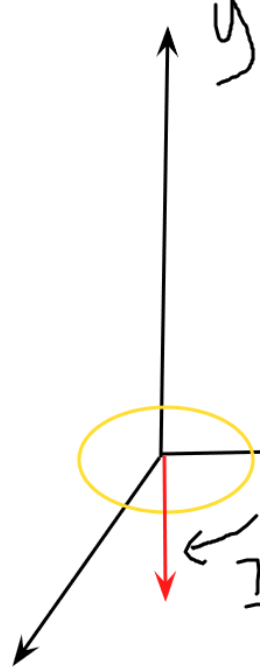
$$\vec{F} = I \cdot \vec{\ell} \times \vec{B} \Rightarrow$$

$$\Rightarrow \vec{F} = 0,5 \text{ A} \cdot (0,5 \text{ m}) \hat{i} \times [(3 \mu\text{T}) \hat{j} + (10 \mu\text{T}) \hat{k}] \Rightarrow$$

$$\vec{F} = 0,5 \text{ A} [0,5 \text{ m} \hat{i} \times 3 \times 10^{-3} \text{ T} \hat{j}] + 0,5 \text{ A} [0,5 \text{ m} \hat{i} \times 10 \times 10^{-3} \text{ T} \hat{k}]$$

$$\Rightarrow \vec{F} = 0,5 \text{ A} [1,5 \times 10^{-3} \text{ mT} \hat{k}] + 0,5 \text{ A} [5 \times 10^{-3} \text{ mT} (-\hat{j})] \Rightarrow$$

$$\Rightarrow \vec{F} = (0,75 \times 10^{-3} \text{ N}) \hat{k} + (0,25 \times 10^{-3} \text{ N}) (-\hat{j})$$



$$I = 2 \text{ A} \quad N = 3 \quad A = 4 \times 10^{-3} \text{ m}^2$$

$$\vec{B} = (2 \text{ mT}) \hat{i} - (3 \text{ mT}) \hat{j} - (4 \text{ mT}) \hat{k}$$

$$a) \quad U = -\vec{\mu} \cdot \vec{B}$$

$$\vec{\mu} = NIA \hat{x} = 3 \cdot 2 \text{ A} \cdot 4 \times 10^{-3} \text{ m}^2 (-\hat{j}) \Rightarrow$$

$$\Rightarrow \vec{\mu} = -24 \times 10^{-3} \text{ A} \cdot \text{m}^2 (\hat{j})$$

$$U = - [24 \times 10^{-3} \text{ A} \cdot \text{m}^2 (-\hat{j})] \cdot [2 \times 10^{-3} \text{ T} (\hat{i}) + (3 \text{ mT}) (-\hat{j}) + (4 \text{ mT}) (-\hat{k})]$$

$$U = - [24 \times 10^{-3} \cdot 3 \times 10^{-3} \text{ J}] = -72 \times 10^{-6} \text{ J}$$

$$\begin{aligned}
 \text{b) } \vec{\tau} &= \vec{\mu} \times \vec{B} \Rightarrow \vec{\tau} = (24 \times 10^{-3} \text{ A}\cdot\text{m}^2)(-\hat{j}) \times \\
 &\times [2 \text{ mT}(\hat{i}) + (3 \text{ mT})(-\hat{j}) + (4 \text{ mT})(-\hat{k})] \Rightarrow \\
 \vec{\tau} &= (24 \times 10^{-3} \cdot 2 \times 10^{-3}) \text{ N}\cdot\text{m} (\hat{k}) + (24 \times 10^{-3} \cdot 4 \times 10^{-3}) \text{ N}\cdot\text{m} (\hat{i}) \\
 \vec{\tau} &= 48 \times 10^{-6} \text{ N}\cdot\text{m} (\hat{k}) + 96 \times 10^{-6} \text{ N}\cdot\text{m} (\hat{i})
 \end{aligned}$$

