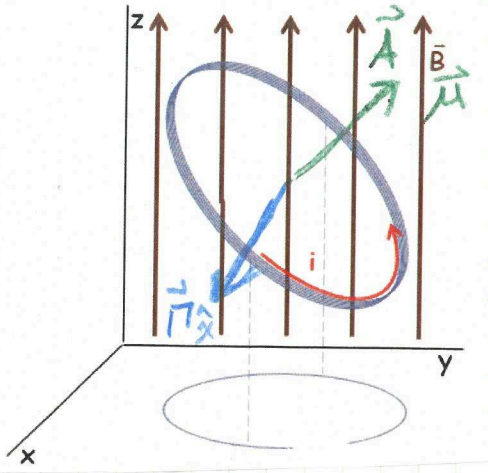
A0D) A 20-TURN COIL OF 40 CM CARRIES $I = 3.0\ A$ IS IN $\vec{B} = 0.5\ T\ \hat{z}$.

a) DRAW $\vec{A}$.

b) WHAT IS $\vec{\mu}$?

c) WHAT IS $|\vec{\tau}|$ ACTING ON COIL

d) DRAW $\vec{\tau}$ ON THE DIAGRAM



a) ON DIAGRAM $\vec{A}$ IS UP AND RIGHT
IT HAS $\hat{y}$ AND $\hat{z}$ COMPONENTS

b) BY TZDII EQUATION 9.8 FOR N TURNS

$$\vec{\mu} = NI\vec{A} = NI(\pi r_{LOOP}^2) \text{ PARALLEL TO } \vec{A}$$

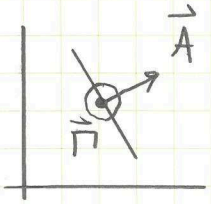
$$|\vec{\mu}| = (20)(3.0)\pi(0.40)^2 = 30.16\ A\cdot m^2$$

$$\boxed{\vec{\mu} = 30.16\ A\cdot m^2 \text{ PARALLEL TO } A}$$

c) BY TZDII EQUATION 9.7

$$|\vec{\tau}| = |\vec{\mu}\times\vec{B}| = \mu B \sin\theta = (30.16)(0.5)\sin(60^\circ)$$

$$\boxed{\vec{\tau} = 13.05\ N\cdot m \text{ IN THE } \hat{x} \text{ DIRECTION}}$$



$\vec{\tau}$ IS OUT OF THE PAGE