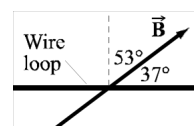


46. **Strategy** The maximum torque occurs when the angle between the normal to the coil and the magnetic field is 90° . Use Eq. (19-13a).

Solution Compute the maximum torque.

$$\tau = NIAB = 100(0.0500 \text{ A})\pi(0.020 \text{ cm})^2(0.20 \text{ T}) = \boxed{0.0013 \text{ N}\cdot\text{m}}$$

48. (a) **Strategy** $\tau = NIAB \sin \theta$ where θ is the angle between \vec{B} and a line perpendicular to the plane of the loop. So, $\theta = 90^\circ - 37^\circ = 53^\circ$.



Solution

$$\boxed{\phantom{0.0013 \text{ N}\cdot\text{m}}}$$

- (b) **Strategy** $B \sin \theta$ is the same at opposite sides of the loop and opposite sides of the loop have equal and opposite \vec{L} s, so the forces on opposite sides are equal and opposite.

Solution

$$\vec{F}_{\text{net}} = \vec{F}_{\text{top}} + \vec{F}_{\text{bottom}} + \vec{F}_{\text{right}} + \vec{F}_{\text{left}} = \vec{F}_{\text{top}} + (-\vec{F}_{\text{top}}) + \vec{F}_{\text{right}} + (-\vec{F}_{\text{right}}) = \boxed{0}$$