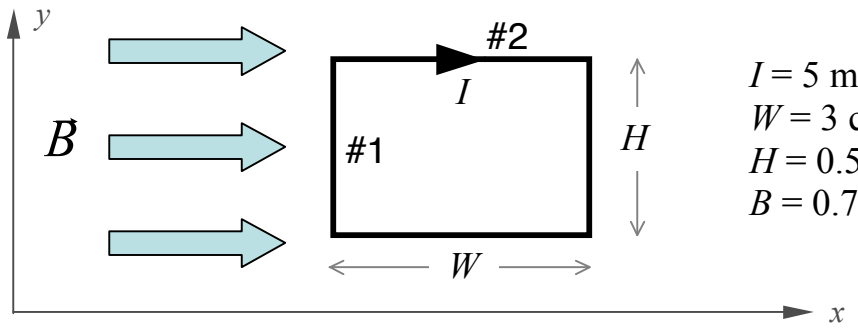
Name: _____ Sec. _____ **P212: Quiz 2 Week 8**

A rectangular wire loop with width W and height H has a clockwise current I running through it. The loop lies in the xy plane, in a constant magnetic field B that points in the $+x$ direction.



$I = 5$ mA
$W = 3$ cm
$H = 0.5$ cm
$B = 0.75$ T

NOTE: Whenever you are asked for a **vector** quantity, give **both** its magnitude **and** direction.

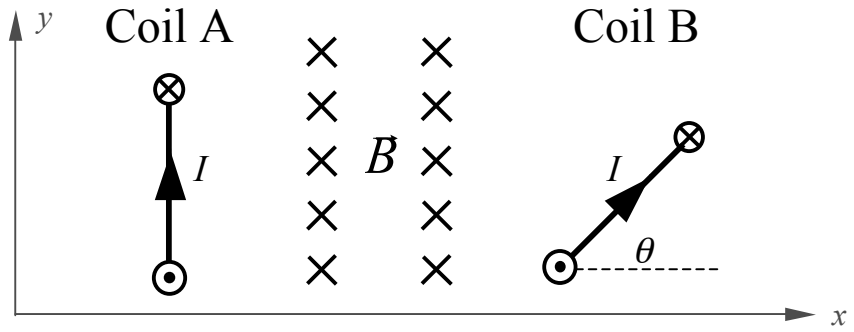
1) Calculate the force $\boldsymbol{F_1}$ on the left segment of wire labeled #1. **[3]**

2) Calculate the force $\boldsymbol{F_2}$ on the top segment of wire labeled #2. **[3]**

3) What is the torque $\boldsymbol{\tau}$ exerted on this loop by the magnetic field? **[6]**

4) In which direction would you point the magnetic field in order for the loop to be in stable equilibrium? **[4]**

5) Two square coils, **A** and **B**, each with side of length a, are situated in a region of constant magnetic field B directed along the negative z-axis as shown in the figure below. A current I flows in each coil in the direction shown. (The black arrows indicate the current direction on the side of the square nearest you.) The tilt angle of coil **B** is $\theta = 45°$. Compare the magnitudes $|\tau_A|$ and $|\tau_B|$ of the torques on coils **A** and **B**. **[4]**



a) $|\tau_A| < |\tau_B|$ b) $|\tau_A| = |\tau_B|$ c) $|\tau_A| > |\tau_B|$