Name:_____

Be sure to show your work **clearly** and **draw a box around your answer**. If any question is unclear, please ask immediately. All answers must have the correct units.

1. (20 pts.) Two long straight wires cross each other at right angles as shown in the figure. Find the magnitude and direction of the magnetic field at point **P**, which is in the same plane as the two wires.
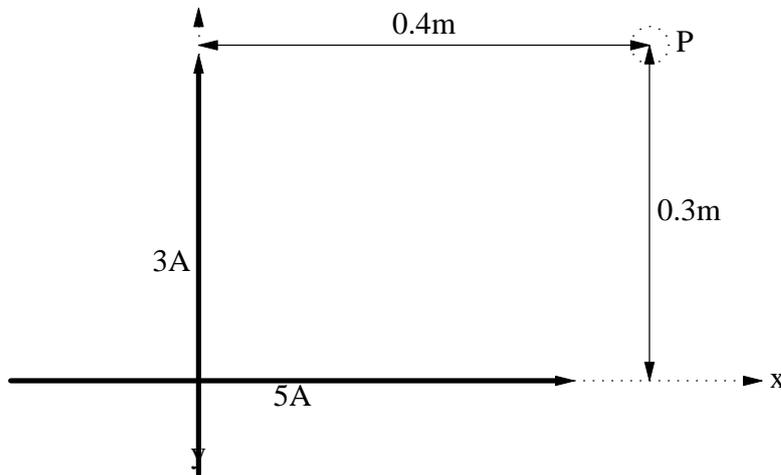
Physics 112-01
Test 2
March 29, 2000

Name: ___SOLUTIONS___

Be sure to show your work **clearly** and **draw a box around your answer**. If any question is unclear, please ask immediately. All answers must have the correct units.

1. (20 pts.) Two long straight wires cross each other at right angles as shown in the figure. Find the magnitude and direction of the magnetic field at point **P**, which is in the same plane as the two wires.
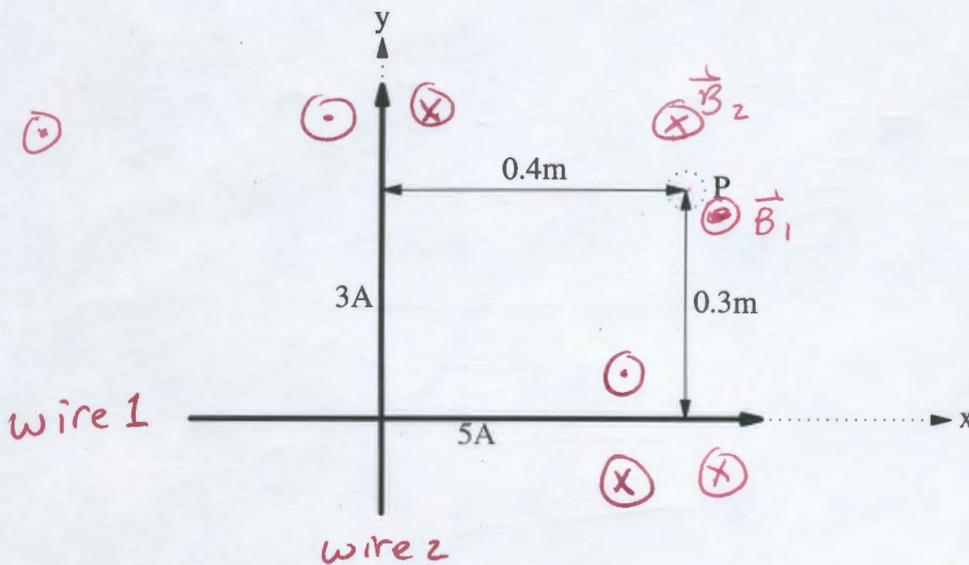
$$B_1 = \text{field due to wire } 1 = \frac{\mu_0 I_1}{2\pi R_1} = \frac{(4\pi\times10^{-7})(5A)}{2\pi\,(0.3m)} = 3.33\times10^{-6}\,T$$

<u>OUT</u> of the page.

$$B_2 = \text{field due to wire } 2 = \frac{\mu_0 I_2}{2\pi R_2} = \frac{(4\pi\times10^{-7})(3A)}{2\pi\,(0.4m)} = 1.50\times10^{-6}\,T$$

<u>INTO</u> the page.

$$B = B_1 - B_2 = \boxed{1.83\times10^{-6}\,T \ \ \text{OUT OF THE PAGE.}}$$

Note: Problem asks for $\vec{B}$, not Force $\vec{F}$.