Physics 172
Winter Quarter 1988
March 15, 1988
George Williams

$\bar{x} = 20.4$

2

FINAL EXAM

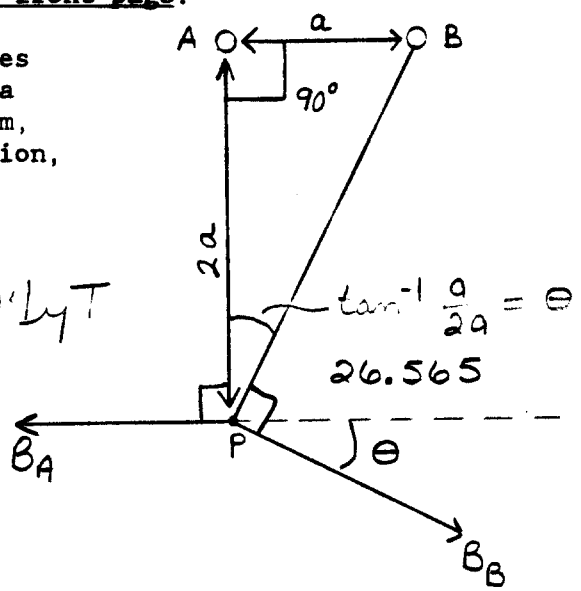
Name (print) Candace Cady Name (signed) _____

Discussion Instructor (circle one): Cady McAllister Molina Stone

Discussion Section #: _____

SHOW ALL WORK!!!!!
REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!
Use the conversion constants and data given on the front page.

A and B are two very long straight wires. A carries a current of 27.0 A into the paper, and B carries a current of 33.0 A out of the paper. If a = 17.0 cm, calculate the magnetic field, magnitude and direction, at point P. Show clearly with a drawing how you define the direction.



$$|\vec{B}_A| = \frac{\mu_0 I_A}{2\pi(2a)} = \frac{(4\pi\times10^{-7})(27.0)}{2\pi\cdot2\cdot(0.17)} = 15.8824\,\mu T$$

$$|\vec{B}_B| = \frac{\mu_0 I_B}{2\pi\sqrt{a^2+(2a)^2}} = \frac{(4\pi\times10^{-7})(33.0)}{2\pi(\sqrt{5}\cdot0.17)}$$

$$= 17.3624\,\mu T$$

$B_x = B_B\cos\theta$ $B_y = B_B\sin\theta$

$= -352.99\,nT$ $= -7.7647\,\mu T$

$$|\vec{B}| = \sqrt{B_x^2 + B_y^2} = 7.77\,\mu T$$

$$\phi = \tan^{-1}\frac{B_y}{B_x} = 87.4°$$