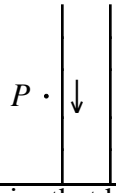
PHYSICS 242 BLOCK 6 DRILL SET, SPRING '17 NAME _____

Slide this paper under Marteena 308's door any time *before* 7:50 AM Friday, February 24, or give it to me in Marteena 312 *by* 8:00 AM that day. Use one different equation from the Block 6 objectives per problem.

For DIRECTION, choose only from these: right (→), left (←), toward the top (↑), toward the bottom (↓), into the paper (⊗), out of the paper (⊙), UNDETERMINED (for a zero magnitude vector), or NONE (for a scalar).

1. A long straight wire of radius 2.2 mm carries an 8.8 A current toward the bottom of the paper. Find the current's magnetic field at point *P* 3.3 mm directly to the left of the center of the wire (1.1 mm from its surface).

EQUATION USED | SOLUTION | ANSWER



_____ MAGNITUDE

_____ DIRECTION

2. A toroid (sometimes called a toroidal solenoid) has 999 turns. It's wound of wire that has a 1.1 mm radius. Each (almost) circular turn of the toroid has a 1.0 cm radius. Within the turns (that is, in the "dough"), a distance of 36 cm from the toroid's center, you want a magnetic field of magnitude 4.9 mT. What must the current be?

EQUATION USED | SOLUTION | ANSWER

3. An 55 turn flat coil is in the plane of the paper. It has a radius of 0.36 m. Its 8.8 A current is counterclockwise. Find the magnetic field of the circular coil at either of the two points on its axis that are 0.48 m from its center.

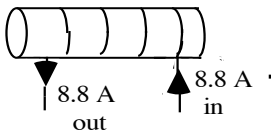
EQUATION USED | SOLUTION | ANSWER

_____ MAGNITUDE

_____ DIRECTION

4. A solenoid has a radius of 1.27 cm, a length of 70 cm, 350 turns, 500 turns/m, and a current of 8.8 A ↑ at its front and ↓ at its back as shown, Find the magnetic field at the center of the solenoid. (To show what's happening, the sketch is not to scale and shows many fewer coils at a much larger separation.)

EQUATION USED | SOLUTION | ANSWER



_____ MAGNITUDE

_____ DIRECTION

5. At this instant, point *P* is 5.5 μm to the right of an electron that is moving at 3.3×10^3 m/s directly toward that point. At point *P*, what magnetic field does the electron instantaneously cause? ⊙ → ·*P*

EQUATION USED | SOLUTION | ANSWER

Here, the direction of the velocity is _____

and the direction of the unit vector is _____,

so ϕ = ____° and sin ϕ = __.

_____ MAGNITUDE

_____ DIRECTION