PHYSICS 242 BLOCK 1 DRILL SET, SPRING '17 NAME _____

Slide this drill set under Marteena 308's door any time **before** 7:50 AM, Friday, January 20, or give it to me in Marteena 312 **by** 8:00 AM that day. **I DO NOT ACCEPT LATE DRILL SETS FOR ANY REASON.** Solve each problem on this and every following drill set using just *one different* equation from the block's objectives sheet. I give one point for each correct equation and one more point for *all* the rest, including math, SI units and any direction. You must show **all** your work to receive credit, **including the numerical values of the metric prefixes when needed,** e.g., substituting 4.43 μC as 4.43×10^{-6} C in your solution.

Please note: unless you write "HOLD" by your name, I assume I have your permission to place your drill sets and exams on top of the bookcase outside Marteena 308 when they have been corrected and recorded.

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. Find the force (in N) on a –4.43 μC point charge from an external electric field of 555 kN/C toward the top (↑).

VECTOR EQUATION USED	SOLUTION (IN **VECTOR** FORM)	ANSWER
$\vec{F}_0 =$	$\vec{F}_0 =$ (–4.43 × 10⁻⁻ C)(555 × 10⁻⁻ N/C)(↑) $\vec{F}_0 =$	_____ N MAGNITUDE _____ DIRECTION

2. The electron and the proton are 52.9 pm apart in the plane of the paper. Find their electric dipole moment.

THE ONE EQUATION USED (**NOT** $p = qd$)	SOLUTION	ANSWER
	electron ⊖ 52.9 pm ⊕ proton	_____ MAGNITUDE _____ DIRECTION

3. The electric dipole moment of an electric dipole is 8.47×10^{-30} C·m right (→) in an external electric field of 5.55×10^5 N/C toward the top (↑). Find the torque this external electric field exerts on the electric dipole.

VECTOR EQUATION USED	SOLUTION (OF THE MAGNITUDE)	ANSWER
$\vec{\ } =$	I used $\phi =$ _____° in finding the **magnitude** as follows: |torque| = __ __ _____ ϕ (symbols), so numerically |torque| =	_____ MAGNITUDE _____ DIRECTION

4. Find the electric field that the proton sets up at point *P* (the position of the electron in Problem 2 above).

THE ONE EQUATION USED	SOLUTION	ANSWER
	P • 52.9 pm ⊕ proton	_____ MAGNITUDE _____ DIRECTION

5. Two equal negative point charges are on the *x*-axis in vacuum at $x = -7.00$ mm and +2.00 mm as shown. The magnitude of their Coulomb's law force is 7.12×10^{-23} N. Find the charge of either one and the direction of force the electric field of charge 1 exerts on charge 2.

THE **ONE** EQUATION USED	SOLUTION	ANSWER
	1⊖ ⊖ 2	– _____ CHARGE _____ DIRECTION OF $\vec{F}_{on2}$