PHYSICS 242 BLOCK 2 DRILL SET, SPRING '17 NAME ______________________________

Slide this drill set under Marteena 308's door any time **before** 7:50 AM Friday, January 27, or give it to me in Marteena 312 *by* 8:00 AM that day. Use *one different* equation from the Block 2 objectives for each problem.

1. A charge of 66.6 pC is uniformly distributed over a flat surface of total area 3.33×10^{-3} m^2. A Gaussian surface encloses 44.4 pC of that charge. First find the flat surface's charge per area. Then use that charge per area to find the area of the flat surface that is inside the Gaussian surface. Hint: Use one equation (from the Block 2 objectives) twice.

ONE EQUATION (USED TWICE) SOLUTION ANSWER

_____________ pC/m^2
charge per area

________________ m^2
area inside

2. Use Gauss's law (non-integral form) to find the net electric flux through the Gaussian surface of Problem 1.

ONE EQUATION USED SOLUTION ANSWER

3. A uniform electric field makes an angle of 20.0° with a flat surface. Thus it makes an angle of 90.0° – 20.0° = 70.0° with the normal to the surface. The area of the surface is 5.55×10^{-5} m^2. The resulting electric flux through the surface is 57.0 N·m^2/C. Calculate the magnitude of the electric field to three significant figures.

ONE EQUATION USED SOLUTION ANSWER

4. A total charge of 0.368 μC is distributed uniformly throughout an entire region, giving a charge per volume of 92.0 μC/m^3. A Gaussian surface encloses 0.222 μC of that charge. What is the volume of that entire region?

ONE EQUATION USED SOLUTION ANSWER

5. We now consider a spherical Gaussian surface of area 3.34×10^{-4} m^2 that is completely outside (and concentric to) a spherical –8.88 nC charge distribution. **Use the integral form of Gauss's law that contains ϕ.** Fill in the blanks correctly. The last two fractions **must** have the correct symbols and then numbers.

EQUATION USED (**must** contain ϕ) SOLUTION ANSWER

= ———

1. Since E is _____________ by ________________, we can take it out of the integral giving $E \oint$ ________ = ——.

2. Here, $\vec{E}$ is directed radially __________________ and $d\vec{A}$ is directed radially __________________, so ϕ = _______° and cos ϕ = ____, giving _____ $\oint dA$ = ——.

3. Then $\oint dA$ = __ (symbol). Solving, E = ——— (symbols) = ———————————— (numbers) =

E =