PHY3063 Spring 2018

HOMEWORK C

Instructor: Yoonseok Lee

Due: February 27, 2018

1. CH28 E-2.
Bring the charges from infinitely far apart. There are 6 pairs of charges you need to consider. The amount of work required $W = U$.

2. CH28 E-25.

3. Ch28 E-42.
The spheres are far apart so that they do not affect each other. The electric potential is only generated by the small conducting sphere initially, and the electric potential is given by $V = k\frac{q}{r}$. *By connecting with a wire, it becomes one conductor and charge will redistribute to make the whole equipotential. The wire is so thin you can ignore the charge on the wire. You will find* $q_2 = 2q_1$. *Now calculate the surface charge density for the two spheres. This is a conceptual explanation on why a high curvature part of a conductor has the higher density charge.*

4. Ch28 E-47 (similar to E-42).

5. CH28 P-4.

5. CH28 P-6.
Conservation of Energy: $\Delta K + \Delta U = 0$ *when there is no non-conservative force.*

6. CH28 P-9.
The electric potential at a given point is $V(x, y, z = 0) = k\frac{q_1}{r_1} + k\frac{q_2}{r_2}$ *where* $r_1 = \sqrt{x^2 + y^2}$ *and* $r_2 =?$. *Then* $0 = \frac{q_1}{r_1} + \frac{q_2}{r_2}$ *will define the equipotential surface of* $V = 0$: $(x + x_c)^2 + y^2 = R^2$. *The answer to (c) is No. Why?*

7. Ch28 P-10.
Nonuniform charge density problem. Nothing to worry. Just do the integration correctly.

8. CH28 P-11.

9. CH29 E-15.

10. CH29 E-24.

11. CH29 P-6.
$I = \int jdA$ *and* $dA = 2\pi r dr$.

12. CH29 P-15.
You do not have to solve this. But think how you would approach this problem.