PHYS 402 – HOMEWORK # 1 – DUE THURSDAY, 01/31/2013

1. **Millikan experiment.** A spherical oil drop of radius $R = 3 \times 10^{-5}$ cm and density $\rho = 0.822$ g·cm^{-3} is placed between two parallel conducting plates at $z = 0$ and $z = d$, where $d = 0.5$ cm. The electrical potential difference between the two plates is 14 V. Compute the electric charge that the drop must have to be kept in equilibrium between the two plates.

2. **Transfer of charge.** Three identical small conducting spheres, A, B and C are held still at the vertices of an equilateral triangle. A and B carry charges $4q$ and q, respectively. C is not charged. C is first brought to contact with A and relocated to its original position, then it is brought to contact with B and relocated to its original position. (a) Compute the ratio of the force between A and B before and after this process. (b) Compute the ratio of the force between B and C after the first and the second step of the process.

Key

Unless otherwise specified, problems are from the course textbook:

David J. Griffiths
INTRODUCTION TO ELECTRODYNAMICS
Pearson, Addison Wesley
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Problem X.Y p.Z means "Problem No. Y of Chapter X, page Z."

Example: Problem 2.1 p.29 = Problem No. 1 of Chapter 2, page 29.
