Name _____ PHY2049C, Homework 3

A- Submit a handwritten version of the solutions (clearly readable) at the beginning of class.

Problem 1

Equation (8.3) in the book shows that the capacitance of a parallel-plate capacitor becomes larger as the plate separation d decreases. However, there is a practical limit to how small d can be made, which places limits on how large C can be. Explain what sets the limit on d. (Hint: What happens to the magnitude of the electric field as d --> 0?)

Problem 2

Consider a point charge Q placed in y=1cm. What is the electric flux due to that charge in the x-z plane? (that is, in the entire, infinite, x-z plane).

Problem 3

A capacitor with unknown capacitance C is charged to 100V. Then, it is connected in parallel to a 60 μF Capacitor initially discharged. If the potential difference on this second capacitor then becomes 40V, what is C?

Problem 4

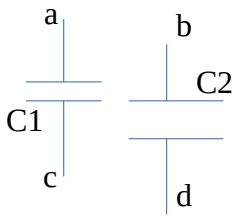
Determine the potential at a point 2.5 mm away from a big negative plate in a parallel plate arrangement separated 10mm and connected to a 24V battery (take the potential in the negative plate to be V=0).

Problem 5

If one requires 6J of work to move two point charges of the same magnitude together from a distance of 1m to 1cm, what could you conclude of the sign and value of the charges?

Problem 6

Two parallel plate capacitors are shown. C1 = 0.4 μF and C2 = 1.2 μF. The volate of the capacitors are V1 and V2 respectively, and the total stored energy is 1.14 mJ. If the terminals *b* and *c* are connected, the potencial difference Va-Vd= 80 V, but if the *a* terminal is connected to the *b* terminal, and *c* is connected to *d*, Va-Vd= 10 V. Find the initial voltages V1, V2



Problem 7

A capacitor has a charge of 15 μC when its potential difference is V. When the charge is augmented to 18 μC, its potential difference increases 6 volts. What is the capcitance C of the capacitor?