

## Physics 5B (Spring 2023): Homework #5

Please submit on online before 6:00 pm on Monday, February 27, 2022.

### **Properties of charged conductors**

**Exercise 3.54** A charged conductor is placed between two plates at the same potential. How is the charge distributed?

### **Capacitors**

**Exercise 3.57**  $2N$  plates with even  $N$ 's connected and odd  $N$ 's connected. Find the capacitance.

**Exercise 3.61** Capacitance of spheroid. For this problem you should check out Section 3.5 of the text, where the  $C$  of an isolated conductor is defined as the ratio of its charge to its potential relative to the potential at infinity (which you can set to zero). You will need the formula for the volume of a spheroid (no need to derive it). To check on answer you might use a computer to plot the energy as a function of ellipticity at constant volume.

**Exercise 3.71** Conductor inside a capacitor. Find the kinetic energy using the change in potential energy stored in the field.

### **Current density**

**Exercise 4.20** Based the definition of current density.

**Exercise 4.21** Current pulse from charged particle on its way from one electrode to another.