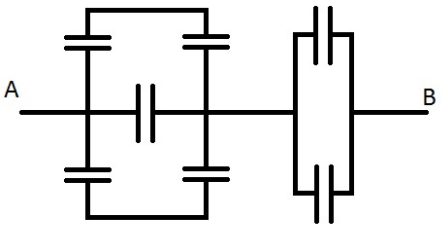
PHYS 212 Homework Assignment

Chapters 8

Problem 1 Find the equivalent capacitance between points A and B in the circuit below. Assume each capacitor has a capacitance of C.



Problem 2 A charged, isolated metal sphere of radius 5 cm has a potential of 8000 V (relative to $V = 0$ at infinity). What is the energy density of the electric field at its surface?

Problem 3 A spherical capacitor is made up of plates with radii 20 cm and 21 cm.

(a) What is its capacitance?

(b) How big must a parallel plate capacitor be to achieve the same capacitance with the same separation?

(c) If the potential difference is 12 V, how much charge is stored on these capacitors?

Problem 4 An air-filled parallel plate capacitor is measured to have a capacitance of 2 pF with a given separation. The distance is doubled and cheese is pumped into the gap between them, giving rise to a new capacitance of 3.5 pF.

(a) What is the dielectric constant of the cheese?

(b) Instead of doubling the distance and adding cheese, how would you have changed the area only to get 3.5 pF?

Problem 5 A capacitor is charged using a potential difference of V. If you want the capacitor to hold 12% more energy, by how much must you increase the voltage?