Assignment

Q① A storage capacitor on a random access memory (RAM) chip has a capacitance of 0.055 pF. If it is charged to 5.3 V, how many excess e^-s are there on its negative plate?

Q② the plates of a parallel-plate capacitor are separated by a distance $d = 1.0$ mm. What must be the plate area if the capacitance is to be 1.0 F?

Q③ the space b/w the conductors of a long coaxial cable, used to transmit TV signals, has an inner radius $a = 0.15$ mm and an outer radius $b = 2.1$ mm. What is the capacitance per unit length of this cable?

Q④ What is the capacitance of the Earth, viewed as an isolated conducting sphere of radius $R = 6370$ km?

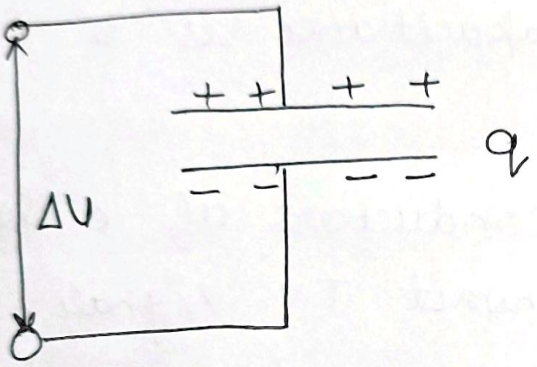
Q⑤ An isolated conducting sphere whose Radius R is 6.85 cm carries a charge $q = 1.25$ nC.

(a) How much energy is stored in the electric field of this charged conductor?

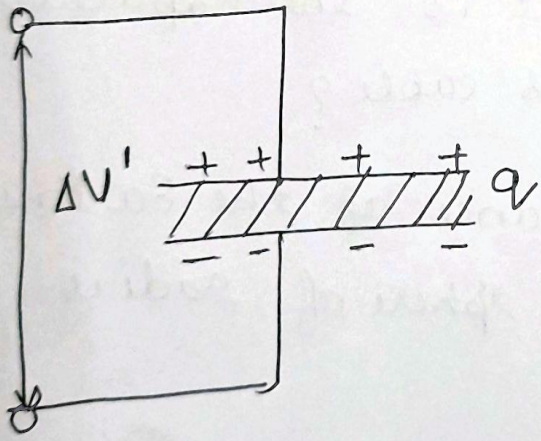
(b) What is the energy density at the surface of the sphere?

(c) What is the radius R_0 of an ~~arbitrary~~ imaginary spherical surface such that one-half of the second potential energy lies within it?

Q. ⑥ A parallel plate capacitor whose capacitance C is 13.5 pF has a potential difference $\Delta V = 12.5$ V across its plates. The charging battery is now disconnected and porcelain slab ($k_e = 6.5$) is slipped b/w the plates as in fig. What is the stored energy of the unit, both before and after the slab is introduced?



An empty ~~conductor~~ capacitor



Capacitor filled with dielectric

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