P142 - fall 2010- Problem set 2

① Ohanian + Markert 23-5

I think this type of expt. is still the most sensitive way to search for fractionally charged (free) particles. Even today Martin Perl's group at SLAC (Stanford Linear Accelerator Center) is doing modern versions of the Millikan oil drop expt. See

http://www.slac.stanford.edu/exp/mps/FCS/FCS.htm

② 23-57

③ 23-9

④ 23-11

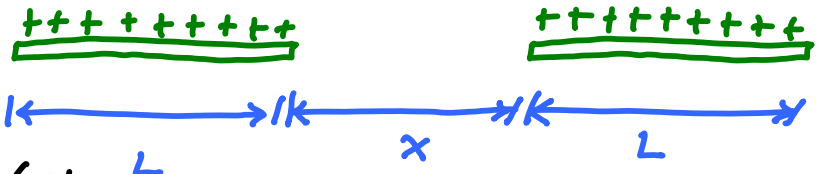
⑤ 23-34

⑥ 23-39

⑦ 23-79

note that the hint given does NOT apply to 23-79 - This is a misprint

(8) Two thin rods of length L carry equal charges Q distributed uniformly over their lengths. The rods are aligned, and their nearest ends are separated by a distance x. What is the electric force of repulsion between these rods?



(9) 23-68

(10) 24-53

(11) A point charge of 6×10^{-8} C sits at a distance of 0.3 m above the x-y plane. What is the electric flux that this charge generates through the (infinite) xy plane?

(12) 24-24

(13) Spend some time playing with the "electric field" and "electric flux" java applets on the class web site.