

You've been hired to design the hardware for an ink jet printer. You know that these printers use a deflecting electrode to cause charged ink drops to form letters on a page. The basic mechanism is that uniform ink drops of about 30 microns radius are charged to varying amounts after being sprayed out towards the page at a speed of about 20 m/s. Along the way to the page, they pass into a region between two deflecting plates that are 1.6 cm long. The deflecting plates are 1.0 mm apart and charged to 1500 volts. You measure the distance from the edge of the plates to the paper and find that it is one-half inch. Assuming an uncharged droplet forms the bottom of the letter, how much charge is needed on the droplet to form the top of a letter 3 mm high (11 pt. type)?