Uniform electric fields HW

Data required:

charge of electron = 1.6×10^{-19} C

mass of electron = 9.11×10^{-31} kg.

1) Here are two closely spaced metal plates connected to a 500 V supply.

+ 500 V

5 cm

0 V
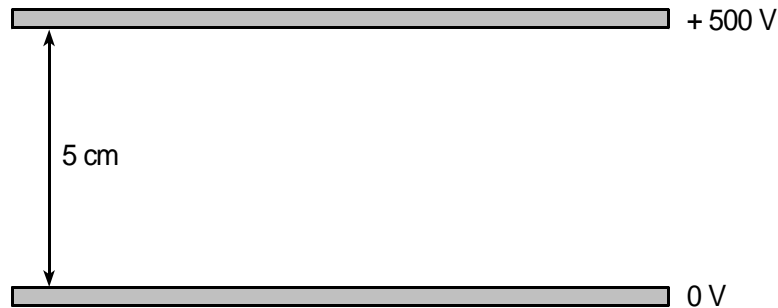
Draw solid lines to represent the electric field both between the plates and just outside the plates. Add arrows to indicate the direction of the field.

2) Add, and label, dotted lines to the diagram of question 1, to represent lines of equipotential at 100 V intervals.

3) In an experiment to measure the charge on an oil drop, the potential difference between two parallel metal plates 5 mm apart was 300 V.

a) Calculate the electric field strength between the plates.

b) Calculate the electrical force on a small oil drop carrying a charge of 3.2×10^{-18} C.

4) Calculate the energy, in joules, gained by an electron accelerated through a potential difference of 50 kV in an X-ray machine.

5) Calculate the speed of an electron with a kinetic energy of 100 eV.