IB Physics
FA 17.2 - CRTs and Capacitors

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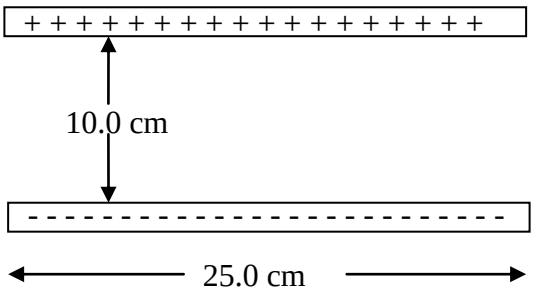
1. A parallel plate capacitor has plates that measure 34.0 cm x 34.0 cm, and an air gap of 1.10 mm. What is the charge on the capacitor if there if a potential difference of 48.0 V across it? (4.46×10^{-8} C)

2. To what voltage must you charge a 12,000 μF capacitor to store 13.0 J of energy? (46.5 V)

3. An RC circuit starts at 4.735 V, and is at 3.20 V 17.0 seconds later. What time will it take to reach 1.00 V? (67.5 s)

4. These plates are separated by 10.0 cm and are 25.0 cm long. An electron traveling at 1.13×10^{6} m/s enters the left side parallel to the plates, and 5.00 cm from each plate, and exits 1.00 cm from the upper plate. What is the acceleration of the electron? What is the electric field between the plates? What voltage is across the plates? (1.63×10^{12} m/s, 9.29 N/C, 0.929 V)



5. 150 keV protons (protons that have been accelerated through 150,000 V) going horizontally enter a steering device that is a couple of parallel plates 8.00 cm long, and 4.00 cm apart. They exit at an angle of 3.20^{o} above horizontal. What is the velocity of the protons as they enter the plates? What must be the final upward velocity as they exit the plates so that it is traveling at this angle? What time is the proton between the plates? What is the vertical acceleration of the proton? What must be the voltage across the plates to achieve this? (5.36×10^{6} m/s, 3.00×10^{5} m/s, 1.49×10^{-8} s, 2.01×10^{13} m/s/s, 8390 V)