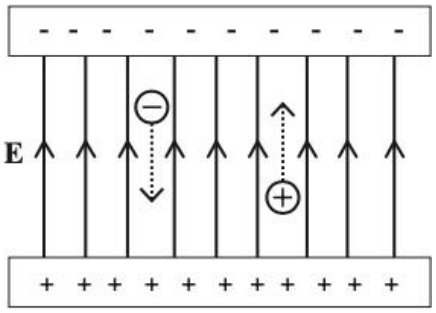
Question 11 **(7 marks)**

High-speed charged particles have many technological and scientific applications. One way of accelerating these particles to high speeds is by using strong electric fields.



(a) Through what potential difference would a proton at rest need to be accelerated for it to achieve a speed of 6.00×10^5 m s^{-1}? (3 marks)

Answer _____ V

(b) What would be the final velocity of an electron accelerated from rest across the same potential difference? If you could not obtain an answer to part (a), use 2.00 kV as the potential difference. (3 marks)

Answer _____ m s^{-1}

(c) What is the ratio of the kinetic energies between the proton and electron once they cross the same potential difference? (1 mark)

Answer _____