HW # 1, 15, 27, 39, 47, 54 Alex Yeoh

11) $\Delta KE = -\Delta PE = \frac{1}{2}mv_b^2 - \frac{1}{2}mv_a^2 = -qV$

$v_b = \sqrt{\frac{-2qV}{m}}$, assuming $v_a = 0$

mass $e^- = 9.11 \cdot 10^{-31}$ kg, mass $p^- = 1.67 \cdot 10^{-27}$ kg

$\frac{v_{e^-}}{v_{p^-}} = \frac{\sqrt{\frac{-2qV}{9.11 \cdot 10^{-31}}}}{\sqrt{\frac{-2qV}{1.67 \cdot 10^{-27}}}} = \sqrt{\frac{-2qV}{9.11 \cdot 10^{-31}} \cdot \frac{1.67 \cdot 10^{-27}}{-2qV}} = \sqrt{\frac{1.67 \cdot 10^{-27}}{9.11 \cdot 10^{-31}}} = 42.8$

15a) $E = \frac{V}{d}$, $V = Ed = 7.5 \cdot 10^4 \cdot 0.04 = 3000V$

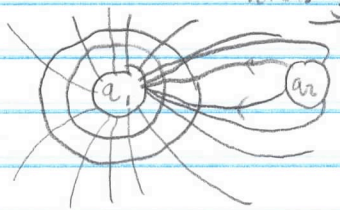
b) $V = Ed = 7.5 \cdot 10^4 \cdot 0.01 = 750V$

27) $V = k\frac{q}{d}$, $d = \frac{kq}{V} = \frac{9 \cdot 10^9 \cdot 14 \cdot 10^{-6}}{100} = 90_m$

$d = \frac{kq}{V} = \frac{9 \cdot 10^9 \cdot 1 \cdot 10^3}{200} = 45m$

39)

Increasing potential →



47) $Q = CV = 4 \cdot 10^{-12} \cdot 5.5 = 4.4 \cdot 10^{-11} C$

54a) $A = 1.5 m^2$, $d = 0.02 \cdot 10^{-3}$ m, $K = 6.7$

$C = K\varepsilon_0 \frac{A}{d} = 6.7 \cdot 8.85 \cdot 10^{-12} \cdot \frac{1.5}{0.02 \cdot 10^{-3}} = 4.45 \cdot 10^{-6} F$

b) $C = 4.45 \cdot 10^{-6}$, $V = 9^3$

$C = \frac{Q}{V}$, $Q = CV = 4.45 \cdot 10^{-6} \cdot 9 = 4 \cdot 10^{-5} C$