Electric Fields Worksheet #4

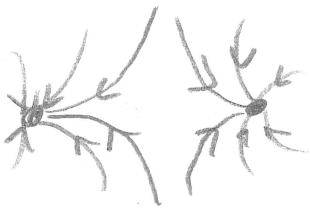
(1) C

(2) A

(3) D

(4) A

(5) D

(6) 

(7) $F = qE$ $\quad -1 \;\bullet\; 1+$ $\quad \leftarrow E$

$= (7\times10^{-6})(260000) = 1.8\ N$ east

(8) $F = qE$ $\quad +1 \;\bullet\; 1-$ $\quad E \rightarrow$

$= (1.6\times10^{-19})(2460) = 3.9\times10^{-16}\ N$ West

(9) $E = \frac{F}{q} = \frac{1.86\times10^{-14}}{1.6\times10^{-19}} = 1.2\times10^{5}\ N/C$ South

(10) $E = \frac{F}{q} = \frac{6.4}{7\times10^{-6}} = 9.1\times10^{5}\ N$ up

(11) (a) $E = \frac{F}{q} = \frac{40 \times 10^{-6}}{20 \times 10^{-6}} = 2$ N/c east

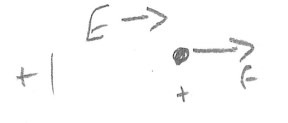
(b) $E = \frac{F}{q} = \frac{20 \times 10^{-6}}{10 \times 10^{-6}} = 2$ N/c east

(12) proton $F = ma$

$qE = ma$

$a = \frac{qE}{m} = \frac{(1.6 \times 10^{-19})(8 \times 10^{4})}{1.67 \times 10^{-27}}$

$a = 7.66 \times 10^{12}$ m/s^2 east



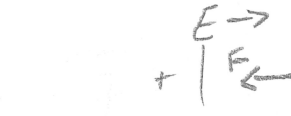
so acceleration = east

electron $F = ma$

$qE = ma$

$a = \frac{qE}{m} = \frac{(1.6 \times 10^{-19})(8 \times 10^{4})}{9.11 \times 10^{-31}}$

$a = 1.41 \times 10^{16}$ m/s^2 west



(13) $F = ma$

$qE = ma$

$a = \frac{qE}{m} = \frac{(1.6 \times 10^{-19})756}{9.11 \times 10^{-31}} = 1.3 \times 10^{14}$ m/s^2

The direction of the acceleration will be in the opposite direction of the field.

(14) (a) The magnitude and the direction of the electric field is the same everywhere.

(b)

(c)

(d) $\Sigma F = ma$

$F_E - w = ma$ (a = 0)

$F_E = w = mg = (9.11 \times 10^{-31})(10) = \underline{9.1 \times 10^{-30}\ N}$

(e) $E = \frac{F}{q} = \frac{9.1 \times 10^{-30}}{1.6 \times 10^{-19}} = \underline{5.7 \times 10^{-11}\ N/C}$

(15)

$\Sigma F = ma$

$F_E - w = ma$ (a = 0)

$F_E = w$

$qE = mg$

$E = \frac{mg}{q} = \frac{(0.012)(10)}{18 \times 10^{-6}} = \underline{6667\ N/C\ down}$