Chem for dis answers

CH132 Assigned problems

Chapter 1

5) Lab ascorbic acid: 30.0 g C and 40.0 g O
Lemon ascorbic acid: 12.7 g C and ? g O

$$\text{Mass of oxygen} = \frac{12.7 \cdot 40.0}{30.0} = 16.93\,g \approx 16.9\,g$$

7) a)

N		Si
33.28 %	=	66.72 %
1.0000 g	=	X

$$X = \frac{1 \cdot 66.72}{33.28} = 2.0048 \approx 2.005\,g \quad \text{Compound 1}$$

N		Si
39.94 %	=	60.06
1.0000 g	=	X

$$X = \frac{1 \cdot 60.06}{39.94} = 1.5037 \approx 1.504\,g \quad \text{Compound 2}$$

b) $\frac{2.005}{1.504} = 1.333 = \frac{4}{3}$ Si_3N_4 $\Rightarrow \frac{4}{3} = 1.333$

1st compound has 2.33 more silicon than Compound 2

So Si_4N_4 or Si_3N_4

11) a) HO or H_2O

b) All would be a 1:1 ratio, so could possibly

13) $2N_2O + 3O_2 \rightarrow 4NO_2$ ← balancing

∴ According to ratio we need 2L of N_2O

we need 3L of O_2

17)

$$\text{Natural Atomic mass} = \frac{92.21 \cdot 27.97693 + 4.7 \cdot 28.97649 + 3.09 \cdot 29.97376}{100}$$

$$= \frac{2579.752 + 136.189503 + 92.6189}{100}$$

$$= 28.0855 \approx 28.086$$

19)

$$10.811 = \frac{19.61 \cdot 10.013 + 80.39 \cdot x}{100}$$

$$\frac{1081.1 - 196.35493}{80.39} = x$$

$$11.0056 = x \approx 11.01$$

21) Plutonium : 94 protons and 94 electrons.

a) Nmetron : Proton b) 94 electrons

145 : 94

3 : 2

145/94 = 1.54

23) 95 protons 95 electrons 146 neutrons

25) 126.90447 g mol^{-1} 1 mol = $6.023 \cdot 10^{23}$ particles

so 1 particle = $\frac{126.90447}{6.023 \cdot 10^{23}} = 2.107298 \cdot 10^{-22}$

27) a) $P_4O_{10} = 4 \cdot 30.974 + 10 \cdot 15.999 = 283.89$

b) $BrCl = 79.904 + 35.45 = 115.36$

c) $Ca(NO_3)_2 = 40.078 + [(14.007 + 3 \cdot 15.99) \cdot 2] = 164.09$

d) $KMnO_4 = 39.098 + 54.938 + 4 \cdot 15.99 = 158.03$

e) $(NH_4)_2SO_4 = (14.007 + 4 \cdot 1.008) \cdot 2 + 32.06 + 4 \cdot 15.999 = 132.13$

31) Vitamin A particle number = $20 \cdot 6.023 \cdot 10^{23} + 30 \cdot 6.023 \cdot 10^{23} + 6.023 \cdot 10^{23}$

$= 51 \cdot 6.023 \cdot 10^{23} = 3.071 \cdot 10^{25}$

Vitamin A_2 = $49 \cdot 6.023 \cdot 10^{23} = 2.951 \cdot 10^{25}$

$\frac{51}{49} = 1.0408 \approx 1.041$ mol

33) $34.5\ kg = 34500\ g$ Volume $= \frac{34500\ g}{13.6\ g/cm^3} = 2536.76\ cm^3$

$= 2.54\ L$

35) Mass of Aluminum Oxide $= 3.97 \cdot 15 = 59.55\ g$

mass = moles · molar $M_r(Al_2O_3) = (26.982 \cdot 2) + (3 \cdot 15.99)$

$= 53.964 + 47.97$

$= 101.934$

moles $= \frac{59.55}{101.934} = 0.58$

# of molecule $= 0.58 \cdot 6.023 \cdot 10^{23}$

$= 3.49 \cdot 10^{23}$

orgo. # of aluminum particle $= 3.49 \cdot 10^{23} \cdot 2 = 7.03 \cdot 10^{23}$

Appendix A

1) a) $5.8 \cdot 10^{-5}$ c) 7.93 e) $2.530 \cdot 10^{-3}$

b) $4 \cdot 10^{2}$ d) $-6.59300 \cdot 10^{3}$ f) 1.47

7) a) 135.64 g should be excluded as it's an outlier

b) $\frac{111.42 + 111.67 + 111.21 + 111.02 + 111.29 + 111.42}{6} = 111.34\ g$

c)

2 4 6 8

index = vec(1:2:end)

11) a) 5 b) 3 c) 2 d) 3 e) 4

13) a) 14 b) -0.0035 c) 340 d) $3.4 \cdot 10^2$ e) $6.2 \cdot 10^{-27}$

$3.4 \cdot 10^2$

17) a) -167.25 b) 76 c) convert to same notation ; $3.1693 \cdot 10^{15}$
d) $-7.59 \cdot 10^{-25}$

19) a) -8.40 b) 0.147 c) $3.24 \cdot 10^{-12}$ d) $4.5 \cdot 10^{13}$

Appendix B.1

1) a) $6.52 \cdot 10^{-10}$ b) $8.8 \cdot 10^{-11}$
c) $5.4 \cdot 10^{12}$ kg $m^2 s^{-3}$ d) $1.7 \cdot 10^4$ kg $m^2 s^{-3} A^{-1}$

7) a) 24.6 ms^{-1} b) $1.51 \cdot 10^3$ kg m^{-3}
c) $1.6 \cdot 10^{-29}$ A s m d) $1.5 \cdot 10^2$ mol m^{-3}
e) 6.7 kg $m^2 s^{-3} = 6.7$ W

9) 1 kW hr = $3.6 \cdot 10^6$ J ; 15.3 kW-hr = $551 \cdot 10^7$ J

Use spy for odd numbers.

Make vector & get elements of odd subscript (; end)

Appendix C.3

13) a) 4.551 b) $1.53 \cdot 10^{-7}$ c) $2.6 \cdot 10^{3}$ d) -49.7264

17) 121.477 // 279 -> wolfram

19) 7.751 and -2.249