INTRODUCTION TO NATURAL SCIENCE

CHEMISTRY – WEEK 1 HW – FALL 2006

Chapter 1

① (a) C = carbon (b) K = potassium
(c) Cl = Chlorine (d) P = phosphorus
(e) Mg = magnesium (f) Ni = nickel

③ (a) Ba (b) Ti (c) Cr (d) Pb (e) As (f) Zn

⑥

	Element	Compound
(a)	Pt	$Pt(NH_3)_2Cl_2$
(b)	Cu	copper(II) oxide
(c)	Silicon	sand

⑦ (a) physical (b) chemical (c) chemical (d) physical
(e) physical (f) physical

⑧ (a) chemical
(b) physical
(c) chemical
(d) physical

⑨ (a) colorless – physical burns in air – chemical
(b) shiny metal – physical reacts readily – chemical
orange, liquid bromine – physical

(12) $\text{density} = \frac{\text{mass}}{\text{volume}}$ $\quad \text{volume} = \frac{\text{mass}}{\text{density}}$

$$\text{volume} = \frac{2.365\ g}{10.5\ g/cm^3} = \underline{\underline{0.225\ cm^3}}$$

(18) $5.5 \times 10^3\ ^\circ C$

$$(5.5 \times 10^3 + 273)\ K = 5773\ K = \underline{\underline{5.8 \times 10^3\ K}}$$

(22) $19\ cm \times \frac{10\ mm}{1\ cm} = 190\ mm = \underline{\underline{1.9 \times 10^2\ mm}}$

$19\ cm \times \frac{1\ m}{100\ cm} = 0.19\ m = \underline{\underline{1.9 \times 10^{-1}\ m}}$

(29) (a) method A

$$\text{average density} = \frac{2.2 + 2.3 + 2.7 + 2.4}{4}\ g/cm^3$$

$$= \underline{\underline{2.4\ g/cm^3}}$$

method B $\quad$ average density $= \frac{2.703 + 2.701 + 2.705 + 5.811}{4}\ g/cm^3$

$$= \underline{\underline{3.480\ g/cm^3}}$$

The last data point in method B ($5.811\ g/cm^3$) should be discarded since it does not agree at all with the other 3 data points.

Excluding that data point

method B average density $= \frac{2.703 + 2.701 + 2.705}{3} = \underline{\underline{2.703\ g/cm^3}}$

(b) method A

$$\% \text{ error} = \frac{|2.4 - 2.702|}{2.702} \times 100\% = 11.18\%$$

$$= \underline{11\%}$$

method B

$$\% \text{ error} = \frac{2.703 - 2.702}{2.702} \times 100\% = 0.037009\%$$

$$= \underline{3.701 \times 10^{-2}\%}$$

(c) Method A is more precise and accurate ~~Method B is more accurate~~ (if you include all the data). After excluding one data point method B is more precise and accurate.

(39) $7.5\ \mu m \times \boxed{\frac{m}{10^6\ \mu m}} = \underline{7.5 \times 10^{-6}\ m}$

$$7.5 \times 10^{-6}\ m \times \frac{10^9\ nm}{m} = \underline{7.5 \times 10^{3}\ nm}$$

$$7.5 \times 10^{-6}\ m \times \frac{10^{12}\ pm}{m} = \underline{7.5 \times 10^{6}\ p.m}$$

(42) $250\ g \text{ of solder} \times \frac{67}{100} = 167.50\ g$

$$= \underline{168\ g}$$