KWANTLEN UNIVERSITY COLLEGE
CHEMISTRY 0094 S-11
EXAM No. 1
January 31, 2002

ANSWER KEY

Question One:

a) 3 sig. figs.

b) 5 sig. figs

c) 2 sig. figs.

d) 3 sig. figs.

Question Two:

a) 6.76×10^{-2} m

b) 2.52 cm^2

c) 2.082 g/cm^3

Question Three:

a) $752\ cm \times \frac{1\ m}{100\ cm} \times \frac{1\ km}{1000\ m} = 7.52 \times 10^{-3}\ km$

b) $4.01\ mm^2 \times (1m / 1000\ mm)^2 = 4.01 \times 10^{-6}\ m^2$

c) $77.2\ kPa \times \frac{1000\ Pa}{1\ kPa} \times \frac{1\ atm}{1.01 \times 10^5\ Pa} \times \frac{14.7\ psi}{1\ atm} = 11.2\ psi$

d)

i) $4.54\ nooks \times \frac{2\ fardells}{1\ nooke} = 9.08\ fardells$

ii) $6.00\ kides \times \frac{4\ yards}{1\ kide} \times \frac{4\ nookes}{1\ yard} \times \frac{2\ fardells}{1\ nooke} = 192\ fardells$

Question Four:

a) $t(K) = t(^oC) + 273.1 = -268.6 + 273.1 = 4.5\ K$

$t(^oF) = 1.80 \times t(^oC) + 32$

$= 1.80 \times (-268.6) + 32 = -451.5\ ^oF$

b) $t(^oC) = \dfrac{t(^oF) - 32}{1.80} = \dfrac{113 - 32}{1.80} = 45\ ^oC$

$t(K) = t(^oC) + 32 = 45 + 273.1 = 318\ K$

Question Five:

a) Volume = l x w x h = 5.00 cm x 10.0 cm x 8.00 cm = 400. cm^3

$\text{Mass} = 7.720\ kg \times \dfrac{1000\ g}{1\ kg} = 7.720 \times 10^3\ g$

$\text{Density} = \dfrac{\text{Mass}}{\text{Volume}} = \dfrac{7.720 \times 10^3\ g}{400.\ cm^3} = 19.3\ g/cm^3$

b)

i) $\text{Volume of water added} = \dfrac{\text{Mass Water}}{\text{Density Water}} = \dfrac{18.52\ g}{1.00\ g/cm^3} = 18.52\ cm^3$

Volume of Metal = Volume of Flask - Volume of Water Added

$= 24.5\ cm^3 - 18.52\ cm^3 = 6.0\ cm^3$

ii) $\text{Density of Metal} = \dfrac{\text{Mass of Metal}}{\text{Volume of Metal}} = \dfrac{20.32\ g}{6.0\ cm^3} = 3.4\ g/cm^3$

Question Six:

$Q = m_{Al}\ s_{Al}\ \Delta T_{Al}$

$= (58.8\ g)(0.910\ J/g\ ^oC)(75.0\ ^oC - 15.0\ ^oC) = 3.21\ kJ$

Question Seven:

a) sulfur **b)** bromine **c)** argon

d) lead **e)** calcium **f)** boron

g) magnesium

Question Eight:

a) Na **b)** Ag **c)** Li

d) P **e)** Hg **f)** Sn

g) Fe

Question Nine:

a) **Element** - A substance that cannot be decomposed into simpler substances by ordinary chemical or physical means.

Compound - A pure distinct substance that is composed of two or more elements and always contains the same relative masses of those elements.

b) **Accuracy** - the agreement of a particular measured value with the true or excepted value.

Precision - the degree of agreement amoung several measurements of the same quantity, i.e. the reproducibility of a measurement.

Question Ten:

a) Physical property

b) Chemical property

c) Physical property

d) Physical property

Question Eleven:

a) Chemical change

b) Physical change

c) Physical change

d) Chemical change

Question Twelve:

a) Element

b) Heterogenous mixture

c) Compound

d) Homogeneous mixture

e) Element

Question Thirteen:

X and **Y** cannot be related by a direct proportionality, since **Y** does not increase when **X** increases.

If **X** and **Y** are related by an inverse proportionality, then

$$\mathbf{Y} = \frac{\mathbf{C}}{\mathbf{X}} \quad \text{or} \quad \mathbf{C} = \mathbf{XY}$$, where **C** is a constant.

X	-1.00	5.00	9.00	16.0
Y	-2.63	0.523	0.291	0.164
C	2.63	2.62	2.62	2.62

Since **C** is a constant **X** and **Y** are inversely proportional.