

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

NAME: _____

Instructions: This exam contains **Thirteen** questions. Read the exam carefully and judge your time accordingly. **ALL CALCULATIONS MUST BE SHOWN TO RECIEVE ANY CREDIT !** If you need extra space, use the back of a preceeding page and clearly indicate the question number.

Maximum Score: 89 points

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Question One: (4 MARKS)

Indicate the number of significant figures for each of the following measured quantities.

a) 0.00524 cm

b) 300.00 g

c) 2.2×10^7 m

d) 124 L

Question Two: (6 MARKS)

Express the result of each of the following calculations to the correct number of significant figures.

(Give the correct units in your answer)

a) $5.17 \times 10^{-3} \text{ m} + 1.7 \times 10^{-3} \text{ m} + 6.071 \times 10^{-2} \text{ m} =$

b) $(0.00630 \text{ cm})(2.003 \text{ cm})(200.0 \text{ cm}) =$

c)
$$\frac{236.45 \text{ g} - 1.3 \text{ g}}{(3.4561 \text{ cm})(32.675 \text{ cm})} =$$

Question Three: (13 MARKS)

Perform the following conversions: (Express your answer to the correct number of significant figures.)

a) 752 cm to km (2)

b) 4.01 mm^2 to m^2 (3)

Question Three: (Continued)

c) 77.2 kPa to psi (14.7 psi = 1 atm; 1 atm = 1.01×10^5 Pa) (3)

d) During earlier times in England, land was measured in units such as fardells, nookes, yards, and kides: 2 fardells = 1 nooke 4 nookes = 1 yard 4 yards = 1 kide.

Determine the following:

i) the number of fardells in 4.54 nookes. (2)

ii) the number of fardells in 6.00 kides. (3)

Question Four: (8 MARKS)

a) Helium has the lowest boiling point of any liquid. It boils at -268.6°C . What is its boiling point in **both** K and $^\circ\text{F}$? (4)

b) The temperature in Tucson, Arizona reached 113°F on a hot summers day. What would this temperature be in **both** $^\circ\text{C}$ and K? (4)

Question Five: (6 MARKS)

- a) A rectangular bar of gold measuring 5.00 cm by 10.0 cm by 8.00 cm has a mass of 7.720 kg. Calculate the density of gold in g/cm^3 . (2)

- b) A piece of metal with an irregular shape weighing 20.32g is added to a flask with a volume of 24.5 cm^3 . It is found that 18.52g of water (density = 1.00 g/cm^3) must be added to the flask containing the metal in order to completely fill the flask.

- i) Determine the volume of the metal. (2)

- ii) Determine the density of the metal. (2)

Question Six: (3 MARKS)

Determine the amount of heat (in kJ) necessary to raise the temperature of 58.8 g of aluminum from $15.0 \text{ }^\circ\text{C}$ to $75.0 \text{ }^\circ\text{C}$. (specific heat of aluminum = $0.910 \text{ J/g}\cdot^\circ\text{C}$)

Question Seven: (14 MARKS)

Give the names of the following elements:

a) S -

b) Br -

c) Ar -

d) Pb-

e) Ca -

f) B -

g) Mg -

Question Eight: (14 MARKS)

Write the chemical symbols for each of the following elements:

a) sodium -

b) silver -

c) lithium -

d) phosphorus -

e) mercury -

f) tin -

g) iron -

Question Nine: (4 MARKS)

Define and distinguish the differences between the following: (Be concise!)

a) an element and a compound.

b) accuracy and precision of measured quantities.

Question Ten: (4 MARKS)

The following data refer to the element sodium. Classify each as either a physical (P) or chemical (C) property.

- a) Its boiling point is 892 °C. _____
- b) It reacts violently with water producing a gas which ignites. _____
- c) Sodium has a silvery metallic luster. _____
- d) Its density is 0.97 g/cm³ at 25 °C. _____

Question Eleven: (4 MARKS)

Classify each of the following as either a physical (P) or a chemical (C) change.

- a) A fresh egg is hard-boiled. _____
- b) A bar of pure iron is melted in a crucible. _____
- c) A teaspoon of sugar is dissolved in a cup of hot water. _____
- d) Grape juice is fermented to produce wine. _____

Question Twelve: (5 MARKS)

Classify each of the following as an element (A), a compound (B), a homogeneous mixture (C), or a heterogeneous mixture (D).

- a) copper _____
- b) garden soil _____
- c) glucose (a sugar) _____
- d) Vinegar (acetic acid dissolved in water) _____
- e) oxygen gas _____

Question Thirteen: (4 MARKS)

Consider the following experimental data:

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

Are **X** and **Y** related by a direct proportionality, an inverse proportionality, or neither? (Show calculations used to determine this.)