**THE FOLLOWING RESOURCE MAY NOT COVER ALL FINAL EXAM MATERIAL**

**LaGuardia Community College** **SCC 101 – Topics in Chemistry**

**Part I. Multiple Choice.** Answer all questions. You may use a calculator, but NO CELL PHONES or notes are permitted during the exam. All questions in Part I are worth 4 pts.

1) How do you express the number 313,700 in scientific notation?

A. 0.000 031 37
B. $3.137\times10^{5}$
C. $3.137\times10^{-5}$
D. $3137\times10^{2}$
E. $313.7\times10^{-3}$

2) Which of the following is **not** a mixture?

A. Calcium chloride
B. Coffee
C. Sea water
D. A jar of rocks and sand
E. The air in the room

3) A particular sample of air is 2.8% water vapor. Express this number in ppm.

A. 0.000 028 ppm
B. 28,000,000 ppm
C. 0.028 ppm
D. 28,000 ppm
E. 2.8 ppm

4) Which anthropogenic pollutants (originating from human activities) are implicated in the formation of most acidic precipitation?

A. Chlorofluorocarbons (CFCs)
B. Sodium hydroxide
C. Ozone
D. Carbon monoxide
E. Nitrogen oxides and sulfur oxides

5) How many valence electrons does an atom of oxygen have?

A. 2
B. 3
C. 4
D. 5
E. 6

6) How many total valence electrons are in a molecule of $SO_3$?

A. 24
B. 4
C. 6
D. 32
E. 18

7) Which of the following statements about ozone is ***false***?

A. Ozone is a form of oxygen with the molecular formula $O_3$.

B. Ozone is a harmful pollutant at high concentrations near the earth's surface.

C. Ozone forms a protective layer in the upper atmosphere.

D. Ozone absorbs UV radiation that can be harmful to living tissue.

E. Ozone makes up the majority of the atmosphere by mass.

8) How many moles is $1.37\times10^{24}$ molecules of water? (1 mole = $6.02\times10^{23}$ molecules)

A. 6.02 moles

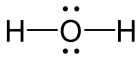
B. 0.228 moles

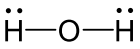
C. 2.28 moles

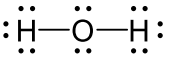
D. 0.0761 moles

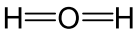
E. 18.0 moles

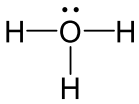
9) Which is the correct Lewis diagram for water ($H_2O$)?

A. 

B. 

C. 

D. 

E. 

10) Which of the following best describes the Greenhouse Effect?

A. Atmospheric oxygen and nitrogen reflect energy radiated from the sun, cooling the Earth.

B. Ozone absorbs ultraviolet radiation from the sun, warming the Earth.

C. Carbon dioxide is absorbed by the ocean, increasing its acidity.

D. Atmospheric gases absorb infrared radiation emitted by the surface, warming the Earth.

E. Pollution in the atmosphere causes health problems for the human population.

11) What is the molarity of a solution made from 1.50 moles of sodium chloride in 750 mL of water?

A. 2.0 M

B. 500 M

C. 5.0 M

D. 1.125 M

E. 1.50 M

12) Which chemical equation correctly shows the dissociation of calcium hydroxide?

A. $Ca(OH)_2 \rightarrow Ca^{2+} + H_2O + O^{2-}$

B. $CaOH \rightarrow Ca^{2+} + OH^{2-}$

C. $Ca(OH)_2 \rightarrow Ca^{2+} + 2OH^{-}$

D. $Ca(OH)_3 \rightarrow Ca^{3+} + OH^{3-}$

E. $Ca(OH)_2 \rightarrow Ca^{2+} + 2H_2O$

13) What is the pH of a solution of HCl with a concentration of $1\times10^{-4}$ M?

A. 2
B. 3
C. 4
D. 5
E. 6

14) What are the two main products of the combustion of gasoline in a car engine?

A. Oxygen and carbon monoxide
B. Sulfur oxides and nitrogen oxides
C. Sulfur oxides and hydrogen gas
D. Water and carbon dioxide
E. Carbon dioxide and oxygen

15) Why are municipal water supplies often "chlorinated" prior to home use?

A. To neutralize the natural acidity of ground water
B. To kill disease-causing organisms in the water
C. To produce gels that remove solids from the water
D. To soften the water
E. To precipitate lead salts as insoluble lead chloride

16) Which of these shows the different types of light in order of increasing wavelength (shortest first, longest last)?

A. infrared < ultraviolet < visible
B. infrared < visible < ultraviolet
C. visible < infrared < ultraviolet
D. ultraviolet < visible < infrared
E. visible < infrared < ultraviolet

17) Which of the following pollutants catalyzes the decomposition of ozone?

A. Chlorofluorocarbons
B. Carbon Dioxide
C. Sulfur oxides
D. Nitrogen oxides
E. $PM_{2.5}$

18) The energy stored in the chemical bonds of fossil fuels is a form of _____ energy.

A. mechanical
B. potential
C. magnetic
D. kinetic
E. heat

19) A radio station transmits at a frequency (ν) of $97.1 \times 10^6\ s^{-1}$. What is the wavelength (λ) of the electromagnetic radiation that carries the station's signal?

Use the speed of light, $c = 3.0 \times 10^8$ m/s and $c = \lambda\nu$

A. $2.8\times 10^{16}$ m

B. 0.32 m

C. $280\times 10^{14}$ m

D. 31 m

E. 3.1 m

20) What is the molar mass of $C_{12}H_{22}O_{11}$?

A. 342.1 g/mol

B. 76.0 g/mol

C. 166.3 g/mol

D. 12.01 g/mol

E. 180.2 g/mol

21) What is the correct name of the ion with the formula $CO_3^{2-}$?

A. carbonite

B. bicarbonate

C. carbonate

D. sulfate

E. carbide

22) What is the formula of the compound $K_2O$?

A. Chromium oxide

B. Potassium dioxygen

C. Oxygen potasside

D. Potassium oxide

E. Methane

23) What is the shape of the $CO_2$ molecule?

A. linear

B. bent

C. trigonal planar

D. trigonal pyramidal

E. tetrahedral

24) Which of the following macromolecules is **insoluble** in water?

A. Protein

B. Lipids (Fats & Oils)

C. Deoxyribonucleic Acid

D. Ribonucleic Acid

E. Carbohydrates

25) Which of the following macromolecules typically makes up the largest percentage of our diets?

A. Protein

B. Lipids (Fats & Oils)

C. Deoxyribonucleic Acid

D. Ribonucleic Acid

E. Carbohydrates

**Part II. Short Answer.** Answer all questions and show all your work to receive full credit. All questions in Part II are worth 15 pts.

26) Complete the following table by writing in the missing compound names and formulas:

| Compound Name | Compound Formula |
|---|---|
| Phosphorus pentachloride | |
| Methane | |
| | $BCl_3$ |
| | $SO_3$ |
| Dinitrogen tetroxide | |

27) Imagine that you are preparing a solution of sodium hydroxide (NaOH) for testing in a lab. You measure out 20.0 g of solid NaOH and dissolve it into 500 mL of water. Answer all of the following questions about this solution.

a. What is the molar mass of NaOH?

b. How many moles of NaOH is 20.0 g?

c. What is the molarity of the solution created when the moles found in part (a) is dissolved into 500 mL of water? Assume the volume of the water doesn't change when NaOH is added.

d. Is this solution acidic, basic, or neutral?

28) Balance the following chemical equations:

$$\_\_\_Al + \_\_\_O_2 \rightarrow \_\_\_Al_2O_3$$

$$\_\_\_C_2H_6O + \_\_\_O_2 \rightarrow \_\_\_CO_2 + \_\_\_H_2O$$

$$\_\_\_Zn + \_\_\_HCl \rightarrow \_\_\_ZnCl_2 + \_\_\_H_2$$

$$\_\_\_C_4H_{10} + \_\_\_O_2 \rightarrow \_\_\_CO_2 + \_\_\_H_2O$$

29) In Lab #5, we determined the fat content of commercial brand potato chips by extracting it with 50 mL petroleum ether. The potato chips were weighed in a crucible, ground with the petroleum ether, and then filtered into a beaker. The petroleum ether was then evaporated off, leaving the fats and oils behind. Using the data in the table below, answer the following questions.

| | |
|---|---|
| **Mass of empty crucible** | 74.356 g |
| **Mass of crucible with potato chips** | 79.832 g |
| **Mass of empty beaker** | 129.023 g |
| **Mass of beaker with fat/oil (after evaporation)** | 130.425 g |

a) What is the percentage of fat in these potato chips?

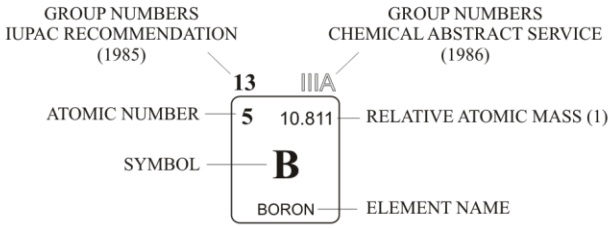
b) If this experiment had been done with **twice as much petroleum ether**, would the fat percentage obtained be different (aside from random error)? **Explain your answer**.

c) If the experiment had been done with **twice as many potato chips**, would the fat percentage obtained be different (aside from random error)? **Explain your answer**.

--Scrap Paper—

# PERIODIC TABLE OF THE ELEMENTS

*http://www.periodni.com*




| PERIOD | 1 IA | 2 IIA | 3 IIIB | 4 IVB | 5 VB | 6 VIB | 7 VIIB | 8 | 9 VIIIB | 10 | 11 IB | 12 IIB | 13 IIIA | 14 IVA | 15 VA | 16 VIA | 17 VIIA | 18 VIIIA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 1.0079 **H** HYDROGEN | | | | | | | | | | | | | | | | | 2 4.0026 **He** HELIUM |
| 2 | 3 6.941 **Li** LITHIUM | 4 9.0122 **Be** BERYLLIUM | | | | | | | | | | | 5 10.811 **B** BORON | 6 12.011 **C** CARBON | 7 14.007 **N** NITROGEN | 8 15.999 **O** OXYGEN | 9 18.998 **F** FLUORINE | 10 20.180 **Ne** NEON |
| 3 | 11 22.990 **Na** SODIUM | 12 24.305 **Mg** MAGNESIUM | | | | | | | | | | | 13 26.982 **Al** ALUMINIUM | 14 28.086 **Si** SILICON | 15 30.974 **P** PHOSPHORUS | 16 32.065 **S** SULPHUR | 17 35.453 **Cl** CHLORINE | 18 39.948 **Ar** ARGON |
| 4 | 19 39.098 **K** POTASSIUM | 20 40.078 **Ca** CALCIUM | 21 44.956 **Sc** SCANDIUM | 22 47.867 **Ti** TITANIUM | 23 50.942 **V** VANADIUM | 24 51.996 **Cr** CHROMIUM | 25 54.938 **Mn** MANGANESE | 26 55.845 **Fe** IRON | 27 58.933 **Co** COBALT | 28 58.693 **Ni** NICKEL | 29 63.546 **Cu** COPPER | 30 65.38 **Zn** ZINC | 31 69.723 **Ga** GALLIUM | 32 72.64 **Ge** GERMANIUM | 33 74.922 **As** ARSENIC | 34 78.96 **Se** SELENIUM | 35 79.904 **Br** BROMINE | 36 83.798 **Kr** KRYPTON |
| 5 | 37 85.468 **Rb** RUBIDIUM | 38 87.62 **Sr** STRONTIUM | 39 88.906 **Y** YTTRIUM | 40 91.224 **Zr** ZIRCONIUM | 41 92.906 **Nb** NIOBIUM | 42 95.96 **Mo** MOLYBDENUM | 43 (98) **Tc** TECHNETIUM | 44 101.07 **Ru** RUTHENIUM | 45 102.91 **Rh** RHODIUM | 46 106.42 **Pd** PALLADIUM | 47 107.87 **Ag** SILVER | 48 112.41 **Cd** CADMIUM | 49 114.82 **In** INDIUM | 50 118.71 **Sn** TIN | 51 121.76 **Sb** ANTIMONY | 52 127.60 **Te** TELLURIUM | 53 126.90 **I** IODINE | 54 131.29 **Xe** XENON |
| 6 | 55 132.91 **Cs** CAESIUM | 56 137.33 **Ba** BARIUM | 57-71 **La-Lu** Lanthanide | 72 178.49 **Hf** HAFNIUM | 73 180.95 **Ta** TANTALUM | 74 183.84 **W** TUNGSTEN | 75 186.21 **Re** RHENIUM | 76 190.23 **Os** OSMIUM | 77 192.22 **Ir** IRIDIUM | 78 195.08 **Pt** PLATINUM | 79 196.97 **Au** GOLD | 80 200.59 **Hg** MERCURY | 81 204.38 **Tl** THALLIUM | 82 207.2 **Pb** LEAD | 83 208.98 **Bi** BISMUTH | 84 (209) **Po** POLONIUM | 85 (210) **At** ASTATINE | 86 (222) **Rn** RADON |
| 7 | 87 (223) **Fr** FRANCIUM | 88 (226) **Ra** RADIUM | 89-103 **Ac-Lr** Actinide | 104 (267) **Rf** RUTHERFORDIUM | 105 (268) **Db** DUBNIUM | 106 (271) **Sg** SEABORGIUM | 107 (272) **Bh** BOHRIUM | 108 (277) **Hs** HASSIUM | 109 (276) **Mt** MEITNERIUM | 110 (281) **Ds** DARMSTADTIUM | 111 (280) **Rg** ROENTGENIUM | 112 (285) **Cn** COPERNICIUM | 113 (. . .) **Uut** UNUNTRIUM | 114 (287) **Fl** FLEROVIUM | 115 (. . .) **Uup** UNUNPENTIUM | 116 (291) **Lv** LIVERMORIUM | 117 (. . .) **Uus** UNUNSEPTIUM | 118 (. . .) **Uuo** UNUNOCTIUM |

LANTHANIDE

| 57 138.91 **La** LANTHANUM | 58 140.12 **Ce** CERIUM | 59 140.91 **Pr** PRASEODYMIUM | 60 144.24 **Nd** NEODYMIUM | 61 (145) **Pm** PROMETHIUM | 62 150.36 **Sm** SAMARIUM | 63 151.96 **Eu** EUROPIUM | 64 157.25 **Gd** GADOLINIUM | 65 158.93 **Tb** TERBIUM | 66 162.50 **Dy** DYSPROSIUM | 67 164.93 **Ho** HOLMIUM | 68 167.26 **Er** ERBIUM | 69 168.93 **Tm** THULIUM | 70 173.05 **Yb** YTTERBIUM | 71 174.97 **Lu** LUTETIUM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

ACTINIDE

| 89 (227) **Ac** ACTINIUM | 90 232.04 **Th** THORIUM | 91 231.04 **Pa** PROTACTINIUM | 92 238.03 **U** URANIUM | 93 (237) **Np** NEPTUNIUM | 94 (244) **Pu** PLUTONIUM | 95 (243) **Am** AMERICIUM | 96 (247) **Cm** CURIUM | 97 (247) **Bk** BERKELIUM | 98 (251) **Cf** CALIFORNIUM | 99 (252) **Es** EINSTEINIUM | 100 (257) **Fm** FERMIUM | 101 (258) **Md** MENDELEVIUM | 102 (259) **No** NOBELIUM | 103 (262) **Lr** LAWRENCIUM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|



(1) Pure Appl. Chem., **81**, No. 11, 2131-2156 (2009)
Relative atomic masses are expressed with five significant figures. For elements that have no stable nuclides, the value enclosed in brackets indicates the mass number of the longest-lived isotope of the element. However three such elements (Th, Pa and U) do have a characteristic terrestrial isotopic composition, and for these an atomic weight is tabulated.

**THE FOLLOWING RESOURCE MAY NOT COVER ALL FINAL EXAM MATERIAL**

**LaGuardia Community College SCC 101 – Topics in ChemistryPart I. Multiple Choice.** Answer all questions. You may use a calculator, but NO CELL PHONES or notes are permitted during the exam. All questions in Part I are worth 4 pts.

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F. 0.000 031 37

G. $3.137\times10^{5}$

H. $3.137\times10^{-5}$

I. $3137\times10^{2}$

J. $313.7\times10^{-3}$

31) Which of the following is **not** a mixture?

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L. Coffee

M. Sea water

N. A jar of rocks and sand

O. The air in the room

32) A particular sample of air is 2.8% water vapor. Express this number in ppm.

P. 0.000 028 ppm

Q. 28,000,000 ppm

R. 0.028 ppm

S. 28,000 ppm

T. 2.8 ppm

33) Which anthropogenic pollutants (originating from human activities) are implicated in the formation of most acidic precipitation?

U. Chlorofluorocarbons (CFCs)

V. Sodium hydroxide

W. Ozone

X. Carbon monoxide

Y. Nitrogen oxides and sulfur oxides

34) How many valence electrons does an atom of oxygen have?

Z. 2

AA. 3

BB. 4

CC. 5

DD. 6

35) How many total valence electrons are in a molecule of $SO_3$?

EE. 24

FF. 4

GG. 6

HH. 32

II. 18

36) Which of the following statements about ozone is ***false***?

JJ. Ozone is a form of oxygen with the molecular formula $O_3$.

KK. Ozone is a harmful pollutant at high concentrations near the earth's surface.

LL. Ozone forms a protective layer in the upper atmosphere.

MM. Ozone absorbs UV radiation that can be harmful to living tissue.

NN. Ozone makes up the majority of the atmosphere by mass.

37) How many moles is $1.37\times10^{24}$ molecules of water? (1 mole = $6.02\times10^{23}$ molecules)

OO. 6.02 moles

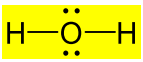
PP. 0.228 moles

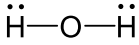
QQ. 2.28 moles

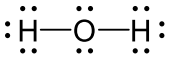
RR. 0.0761 moles

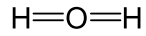
SS. 18.0 moles

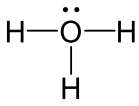
38) Which is the correct Lewis diagram for water ($H_2O$)?

TT. 

UU. 

VV. 

WW. 

XX. 

39) Which of the following best describes the Greenhouse Effect?

YY. Atmospheric oxygen and nitrogen reflect energy radiated from the sun, cooling the Earth.

ZZ. Ozone absorbs ultraviolet radiation from the sun, warming the Earth.

AAA. Carbon dioxide is absorbed by the ocean, increasing its acidity.

BBB. Atmospheric gases absorb infrared radiation emitted by the surface, warming the Earth.

CCC. Pollution in the atmosphere causes health problems for the human population.

40) What is the molarity of a solution made from 1.50 moles of sodium chloride in 750 mL of water?

DDD. 2.0 M

EEE. 500 M

FFF. 5.0 M

GGG. 1.125 M

HHH. 1.50 M

41) Which chemical equation correctly shows the dissociation of calcium hydroxide?

III. $Ca(OH)_2 \rightarrow Ca^{2+} + H_2O + O^{2-}$

JJJ. $CaOH \rightarrow Ca^{2+} + OH^{2-}$

KKK. $Ca(OH)_2 \rightarrow Ca^{2+} + 2OH^{-}$

LLL. $Ca(OH)_3 \rightarrow Ca^{3+} + OH^{3-}$

MMM. $Ca(OH)_2 \rightarrow Ca^{2+} + 2H_2O$

42) What is the pH of a solution of HCl with a concentration of $1\times10^{-4}$ M?

NNN. 2

OOO. 3

PPP. 4

QQQ. 5

RRR. 6

43) What are the two main products of the combustion of gasoline in a car engine?

SSS. Oxygen and carbon monoxide

TTT. Sulfur oxides and nitrogen oxides

UUU. Sulfur oxides and hydrogen gas

VVV. Water and carbon dioxide

WWW. Carbon dioxide and oxygen

44) Why are municipal water supplies often "chlorinated" prior to home use?

XXX. To neutralize the natural acidity of ground water

YYY. To kill disease-causing organisms in the water

ZZZ. To produce gels that remove solids from the water

AAAA. To soften the water

BBBB. To precipitate lead salts as insoluble lead chloride

45) Which of these shows the different types of light in order of increasing wavelength (shortest first, longest last)?

CCCC. infrared < ultraviolet < visible

DDDD. infrared < visible < ultraviolet

EEEE. visible < infrared < ultraviolet

FFFF. ultraviolet < visible < infrared

GGGG. visible < infrared < ultraviolet

46) Which of the following pollutants catalyzes the decomposition of ozone?

HHHH. Chlorofluorocarbons

IIII. Carbon Dioxide

JJJJ. Sulfur oxides

KKKK. Nitrogen oxides

LLLL. $PM_{2.5}$

47) The energy stored in the chemical bonds of fossil fuels is a form of _____ energy.

MMMM. mechanical

NNNN. potential

OOOO. magnetic

PPPP. kinetic

QQQQ. heat

48) A radio station transmits at a frequency (ν) of 97.1 × $10^6$ $s^{-1}$. What is the wavelength (λ) of the electromagnetic radiation that carries the station's signal?

Use the speed of light, c = 3.0 x $10^8$ m/s and c = λν

RRRR. 2.8× $10^{16}$ m

SSSS. 0.32 m

TTTT. 280× $10^{14}$ m

UUUU. 31 m

VVVV. 3.1 m

49) What is the molar mass of $C_{12}H_{22}O_{11}$?

WWWW. 342.1 g/mol

XXXX. 76.0 g/mol

YYYY. 166.3 g/mol

ZZZZ. 12.01 g/mol

AAAAA. 180.2 g/mol

50) What is the correct name of the ion with the formula $CO_3^{2-}$?

BBBBB. carbonite

CCCCC. bicarbonate

DDDDD. carbonate

EEEEE. sulfate

FFFFF. carbide

51) What is the formula of the compound $K_2O$?

F. Chromium oxide

G. Potassium dioxygen

H. Oxygen potasside

I. Potassium oxide

J. Methane

52) What is the shape of the $CO_2$ molecule?

F. linear

G. bent

H. trigonal planar

I. trigonal pyramidal

J. tetrahedral

53) Which of the following macromolecules is **insoluble** in water?

GGGGG. Protein

HHHHH. Lipids (Fats & Oils)

IIIII. Deoxyribonucleic Acid

JJJJJ. Ribonucleic Acid

KKKKK. Carbohydrates

54) Which of the following macromolecules typically makes up the largest percentage of our diets?

LLLLL. Protein

MMMMM. Lipids (Fats & Oils)

NNNNN. Deoxyribonucleic Acid

OOOOO. Ribonucleic Acid

PPPPP. Carbohydrates

**Part II. Short Answer.** Answer all questions and show all your work to receive full credit. All questions in Part II are worth 15 pts.

55) Complete the following table by writing in the missing compound names and formulas:

| Compound Name | Compound Formula |
|---|---|
| Phosphorus pentachloride | **$PCl_5$** |
| Methane | **$CH_4$** |
| **Boron trichloride** | $BCl_3$ |
| **Sulfur trioxide** | $SO_3$ |
| Dinitrogen tetroxide | **$N_2O_4$** |

56) Imagine that you are preparing a solution of sodium hydroxide (NaOH) for testing in a lab. You measure out 20.0 g of solid NaOH and dissolve it into 500 mL of water. Answer all of the following questions about this solution.

a. What is the molar mass of NaOH?

Molar mass NaOH = 22.990 + 15.999 + 1.0079 = **39.9969 g/mol ≈ 40 g/mol**

b. How many moles of NaOH is 20.0 g?

20.0 g NaOH / 39.9969 g/mol = **0.500 mol NaOH**

c. What is the molarity of the solution created when the moles found in part (a) is dissolved into 500 mL of water? Assume the volume of the water doesn't change when NaOH is added.

Molarity = moles/Liters = 0.500 mol NaOH / 0.500 L = **1.00 M**

d. Is this solution acidic, basic, or neutral?

NaOH is **basic** (pH = 14)

57) Balance the following chemical equations:

$$\underline{4}\,Al + \underline{3}\,O_2 \rightarrow \underline{2}\,Al_2O_3$$

$$\underline{1}\,C_2H_6O + \underline{3}\,O_2 \rightarrow \underline{2}\,CO_2 + \underline{3}\,H_2O$$

$$\underline{1}\,Zn + \underline{2}\,HCl \rightarrow \underline{1}\,ZnCl_2 + \underline{1}\,H_2$$

$$\underline{2}\,C_4H_{10} + \underline{13}\,O_2 \rightarrow \underline{8}\,CO_2 + \underline{10}\,H_2O$$

58) In Lab #5, we determined the fat content of commercial brand potato chips by extracting it with 50 mL petroleum ether. The potato chips were weighed in a crucible, ground with the petroleum ether, and then filtered into a beaker. The petroleum ether was then evaporated off, leaving the fats and oils behind. Using the data in the table below, answer the following questions.

| | |
|---|---|
| **Mass of empty crucible** | 74.356 g |
| **Mass of crucible with potato chips** | 79.832 g |
| **Mass of empty beaker** | 129.023 g |
| **Mass of beaker with fat/oil (after evaporation)** | 130.425 g |

d) What is the percentage of fat in these potato chips?

Mass of potato chips = 79.832 – 74.356 = 5.476 g

Mass of fat/oil = 130.425 – 129.023 = 1.402 g

% fat = (1.402/5.476)*100 = **25.60%**

e) If this experiment had been done with **twice as much petroleum ether**, would the fat percentage obtained be different (aside from random error)? **Explain your answer**.

**No**, it should be the same because the pet ether is just the extraction medium. It shouldn't change the amount of oil in the chips. (It could also be acceptable to say that it would be higher because more pet ether would more effectively extract all pf the fat and oil in the chips.)

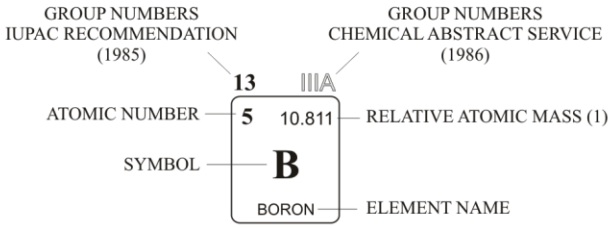
f) If the experiment had been done with **twice as many potato chips**, would the fat percentage obtained be different (aside from random error)? **Explain your answer**.

**No**, because the percentage is a ratio of fat to chips. If the amount of chips increases, so would the amount of fat found.

--Scrap Paper—

# PERIODIC TABLE OF THE ELEMENTS

*http://www.periodni.com*




| PERIOD | 1 IA | 2 IIA | 3 IIIB | 4 IVB | 5 VB | 6 VIB | 7 VIIB | 8 | 9 VIIIB | 10 | 11 IB | 12 IIB | 13 IIIA | 14 IVA | 15 VA | 16 VIA | 17 VIIA | 18 VIIIA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 1.0079 **H** HYDROGEN | | | | | | | | | | | | | | | | | 2 4.0026 **He** HELIUM |
| 2 | 3 6.941 **Li** LITHIUM | 4 9.0122 **Be** BERYLLIUM | | | | | | | | | | | 5 10.811 **B** BORON | 6 12.011 **C** CARBON | 7 14.007 **N** NITROGEN | 8 15.999 **O** OXYGEN | 9 18.998 **F** FLUORINE | 10 20.180 **Ne** NEON |
| 3 | 11 22.990 **Na** SODIUM | 12 24.305 **Mg** MAGNESIUM | | | | | | | | | | | 13 26.982 **Al** ALUMINIUM | 14 28.086 **Si** SILICON | 15 30.974 **P** PHOSPHORUS | 16 32.065 **S** SULPHUR | 17 35.453 **Cl** CHLORINE | 18 39.948 **Ar** ARGON |
| 4 | 19 39.098 **K** POTASSIUM | 20 40.078 **Ca** CALCIUM | 21 44.956 **Sc** SCANDIUM | 22 47.867 **Ti** TITANIUM | 23 50.942 **V** VANADIUM | 24 51.996 **Cr** CHROMIUM | 25 54.938 **Mn** MANGANESE | 26 55.845 **Fe** IRON | 27 58.933 **Co** COBALT | 28 58.693 **Ni** NICKEL | 29 63.546 **Cu** COPPER | 30 65.38 **Zn** ZINC | 31 69.723 **Ga** GALLIUM | 32 72.64 **Ge** GERMANIUM | 33 74.922 **As** ARSENIC | 34 78.96 **Se** SELENIUM | 35 79.904 **Br** BROMINE | 36 83.798 **Kr** KRYPTON |
| 5 | 37 85.468 **Rb** RUBIDIUM | 38 87.62 **Sr** STRONTIUM | 39 88.906 **Y** YTTRIUM | 40 91.224 **Zr** ZIRCONIUM | 41 92.906 **Nb** NIOBIUM | 42 95.96 **Mo** MOLYBDENUM | 43 (98) **Tc** TECHNETIUM | 44 101.07 **Ru** RUTHENIUM | 45 102.91 **Rh** RHODIUM | 46 106.42 **Pd** PALLADIUM | 47 107.87 **Ag** SILVER | 48 112.41 **Cd** CADMIUM | 49 114.82 **In** INDIUM | 50 118.71 **Sn** TIN | 51 121.76 **Sb** ANTIMONY | 52 127.60 **Te** TELLURIUM | 53 126.90 **I** IODINE | 54 131.29 **Xe** XENON |
| 6 | 55 132.91 **Cs** CAESIUM | 56 137.33 **Ba** BARIUM | 57-71 **La-Lu** Lanthanide | 72 178.49 **Hf** HAFNIUM | 73 180.95 **Ta** TANTALUM | 74 183.84 **W** TUNGSTEN | 75 186.21 **Re** RHENIUM | 76 190.23 **Os** OSMIUM | 77 192.22 **Ir** IRIDIUM | 78 195.08 **Pt** PLATINUM | 79 196.97 **Au** GOLD | 80 200.59 **Hg** MERCURY | 81 204.38 **Tl** THALLIUM | 82 207.2 **Pb** LEAD | 83 208.98 **Bi** BISMUTH | 84 (209) **Po** POLONIUM | 85 (210) **At** ASTATINE | 86 (222) **Rn** RADON |
| 7 | 87 (223) **Fr** FRANCIUM | 88 (226) **Ra** RADIUM | 89-103 **Ac-Lr** Actinide | 104 (267) **Rf** RUTHERFORDIUM | 105 (268) **Db** DUBNIUM | 106 (271) **Sg** SEABORGIUM | 107 (272) **Bh** BOHRIUM | 108 (277) **Hs** HASSIUM | 109 (276) **Mt** MEITNERIUM | 110 (281) **Ds** DARMSTADTIUM | 111 (280) **Rg** ROENTGENIUM | 112 (285) **Cn** COPERNICIUM | 113 (. . .) **Uut** UNUNTRIUM | 114 (287) **Fl** FLEROVIUM | 115 (. . .) **Uup** UNUNPENTIUM | 116 (291) **Lv** LIVERMORIUM | 117 (. . .) **Uus** UNUNSEPTIUM | 118 (. . .) **Uuo** UNUNOCTIUM |

LANTHANIDE

| 57 138.91 **La** LANTHANUM | 58 140.12 **Ce** CERIUM | 59 140.91 **Pr** PRASEODYMIUM | 60 144.24 **Nd** NEODYMIUM | 61 (145) **Pm** PROMETHIUM | 62 150.36 **Sm** SAMARIUM | 63 151.96 **Eu** EUROPIUM | 64 157.25 **Gd** GADOLINIUM | 65 158.93 **Tb** TERBIUM | 66 162.50 **Dy** DYSPROSIUM | 67 164.93 **Ho** HOLMIUM | 68 167.26 **Er** ERBIUM | 69 168.93 **Tm** THULIUM | 70 173.05 **Yb** YTTERBIUM | 71 174.97 **Lu** LUTETIUM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

ACTINIDE

| 89 (227) **Ac** ACTINIUM | 90 232.04 **Th** THORIUM | 91 231.04 **Pa** PROTACTINIUM | 92 238.03 **U** URANIUM | 93 (237) **Np** NEPTUNIUM | 94 (244) **Pu** PLUTONIUM | 95 (243) **Am** AMERICIUM | 96 (247) **Cm** CURIUM | 97 (247) **Bk** BERKELIUM | 98 (251) **Cf** CALIFORNIUM | 99 (252) **Es** EINSTEINIUM | 100 (257) **Fm** FERMIUM | 101 (258) **Md** MENDELEVIUM | 102 (259) **No** NOBELIUM | 103 (262) **Lr** LAWRENCIUM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|



(1) Pure Appl. Chem., **81**, No. 11, 2131-2156 (2009)
Relative atomic masses are expressed with five significant figures. For elements that have no stable nuclides, the value enclosed in brackets indicates the mass number of the longest-lived isotope of the element. However three such elements (Th, Pa and U) do have a characteristic terrestrial isotopic composition, and for these an atomic weight is tabulated.