Exam I   General Chemistry I (CHEM 201) Form A 9/12/12 8 am MWF   Dr. Hahn   Exam # _____

Name_____ Key _____ (print) Name __ SA _____(sign)

Please show work for partial credit on the Long Answers and in some of the Short Answer Questions.   Multiple choice questi
have no partial credit.   Please write anything you want graded legibly.   If I cannot read your work, I obviously cannot
grade it. (1 pts print AND sign exam) NA = not attempted   BA = bad attempt

**Part I   MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.   (No
Partial Credit for MC) (3 pts per question, 21 pts pts total)**

1) The boiling of water is a   NW = no work   NE = no explain   1) __A__

   A) physical change because the gaseous water is chemically the same as the liquid

   B) physical change because the water merely disappear

   C) chemical change because a gas (steam) is given off

   D) chemical change because heat is needed for the process to occur

2) The state of matter for an object that has both definite volume and definite shape is   2) __D__
   A) elemental state   B) mixed state   C) gaseous state   D) solid state

3) A metric unit for length is   3) __B__
   A) gram   B) kilometer   C) milliliter   D) yard

4) We generally report a measurement by recording all of the certain digits plus ____   4) __B__
   uncertain digit(s).

   A) two   B) one   C) no   D) three

5) A solution is also called a   5) __B__
   A) compound   B) homogeneous mixture
   C) heterogeneous mixture   D) compound

6) Express 0.000779 in scientific notation.   6) __C__

   A) 7.79×10^4 B) 779×10^{-6} C) 7.79×10^{-4} D) 7.79×10^2

7) The correct name for Li Cl is   7) __C__
   A) monolithium chloride   B) monolithium monochloride
   C) lithium chloride   D) lithium monochloride

— 1 each wrong blank

Part II: Short Answers (49 pts) Show work on all questions for partial and full credit even on questions which do not specify.

1.   one kilometer equals __1000__ meter or one meter = __10^{-3}__ kilometers (8 pt, 4 pts each)

2.   What element symbol has atomic number of 49 ? __In__ (5 pts)

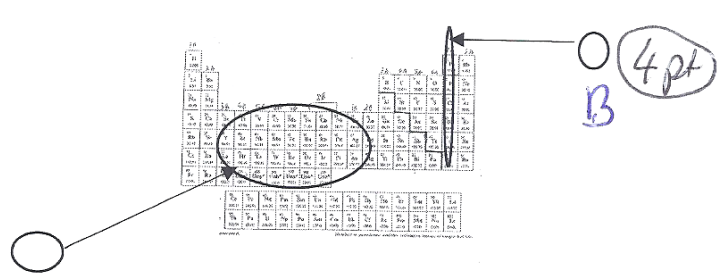3.   Periodic Table and atom symbols: (22 pts total, 2 pts each blank)

For the element **Rb**

(a) Give the atomic number   __37__

(b) Give the atomic mass number __85.5__

(c) How many protons __37__

(d) How many electrons for the neutral atom __37__

(e) Give the symbol in the format $^A_Z X$ for the same element __$^{85}_{37} Rb$__

— $\frac{1}{2}$ pt

(f) What group is the element in __1A__ (g) What period is the element in __5__

gp. → period —1

(h) How many valence electrons ? __1 $\bar{e}$__

(f) What is the likely charge on the element __+1__ (2 pts) Explain or show work. (2 pts)

+ (group #) = +1

(g) Is the element a [(metal) or (nonmetal)]

4. Match the following to the letters shown.   The letters may only be used one time or not at all. (8 pts total, 4 pts each)

(A) period   (B) group   (C) main group (representative elements) (D) transition metal elements
(E) lanthanide/actinide

B (4 pt)

D

5   Name the compound given below (given the element names). $Sr_3 N_2$ (strontium nitrogen) (6 pts)

strontium   nitride   (# prefix)

3 pt   3 pt.

Part III: Long Answers   (30 pts) Show work on all questions for partial and full credit even on questions which do not specify.

1.   a.   During Hurricane Florence Prep, traffic on I-26 West was traveling at the rate of 25.8 miles per hour. How fast is that in kilometers per minute ?   (1 mile = 5280 feet, 1 foot = 12 inches, 1 inch = 2.54 cm, 100 cm = 1 meter, 1000 meters = 1 kilometers, 60 minutes = 1 hour) (12 pts)

$$\frac{25.8 \text{ miles}}{\text{hour}} \times \frac{5280 \text{ feet}}{1 \text{ mile}} \times \frac{12 \text{ inches}}{1 \text{ foot}} \times \frac{2.54 \text{ cm}}{1 \text{ inch}}$$

$$\times \frac{1 \text{ meter}}{100 \text{ cm}} \times \frac{1 \text{ km}}{1000 \text{ m}} \times \frac{1 \text{ hour}}{60 \text{ min}} = 0.692 \frac{\text{km}}{\text{min}}$$

3 s.f.

BA = -6   attempt -2

b.   How long in hours will it take for you to travel 15.3 miles from work to home ? (3 pts)

$$15.3 \text{ miles} \times \frac{\text{hour}}{25.8 \text{ miles}} = 0.593 \text{ hours}$$

-½ pt   BA = -1½

2.   a.   Someone made a heterogeneous mixture of gold nuggets and copper pellets.   If you know that you added 2.5 quarts of the gold (to make the heterogeneous mixture), what is the volume of the gold nuggets in the heterogeneous mixture in mL. (1 liter = 1.06 quarts, 1000 mL = 1 Liter) (12 pts)

$$2.5 \text{ quarts} \times \frac{1 \text{ liter}}{1.06 \text{ quarts}} \times \frac{1000 \text{ ml}}{1 \ell} = 2358.5$$

2 s.f.

$$2.4 \times 10^3 \text{ ml gold}$$

BA = -6 pt

attempt -2

b.   If the ratio of gold to copper in the heterogenous mixture is 1:1 by volume, what is the mass of the copper in the heterogenous mixture ? (density of copper is 8.96 g / mL) (3 pts)

$$2.4 \times 10^3 \frac{\text{ml}}{\text{gold}} \times \frac{1 \text{ ml Cu}}{1 \text{ ml gold}} \times \frac{8.96 \text{ g Cu}}{\text{ml Cu}} = 2.2 \times 10^4 \text{ g Cu}$$

BA = -1½   attempt -½

Name_____Key_____ (print) Name ___*SB*_____(sign)

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grade it. (1 pts print AND sign exam)   NA = not attempted   blue   BA = bad attempt

**Part I   MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.   (No
Partial Credit for MC) (3 pts per question, 21 pts pts total)**

NW = no work   NE = no explanation

1) Express 0.000779 in scientific notation.   1) __D__

   A) 7.79×10^2 B) 7.79×10^4 C) 779×10^{-6} D) 7.79×10^{-4}

2) The correct name for Li Cl is   2) __B__
   A) lithium monochloride   B) lithium chloride
   C) monolithium chloride   D) monolithium monochloride

3) The state of matter for an object that has both definite volume and definite shape is   3) __A__
   A) solid state   B) gaseous state   C) mixed state   D) elemental state

4) We generally report a measurement by recording all of the certain digits plus _____   4) __D__
   uncertain digit(s).

   A) no   B) two   C) three   D) one

5) The boiling of water is a   5) __A__

   A) physical change because the gaseous water is chemically the same as the liquid

   B) chemical change because a gas (steam) is given off

   C) chemical change because heat is needed for the process to occur

   D) physical change because the water merely disappear

6) A metric unit for length is   6) __D__
   A) milliliter   B) yard   C) gram   D) |kilometer

7) A solution is also called a   7) __A__
   A) homogeneous mixture   B) compound
   C) compound   D) heterogeneous mixture

Part II: Short Answers (49 pts) Show work on all questions for partial and full credit even on questions which do not specify.

[handwritten in red: −1 each in wrong blank]

1.   _1000_ milliliters = 1 liters   or   one mL = _10^{-3}_ Liters (8 pt, 4 pts each)

2.   What element symbol has atomic number of 18 ? _Ar_ (5 pts)

3.   Periodic Table and atom symbols: (22 pts total, 2 pts each blank)

For the element **Cl**

(a) Give the atomic number _17_

(b) Give the atomic mass number _35.5_

(c) How many protons _17_

(d) How many electrons for the neutral atom _17_

[red annotation: −½ pt $^{35}_{17}Cl$]

(e) Give the symbol in the format $^{A}_{Z}X$ for the same element _^{17} Cl_

(f) What group is the element in _7A_ (g) What period is the element in _3_

[red annotation: gp. + period backwards −1]
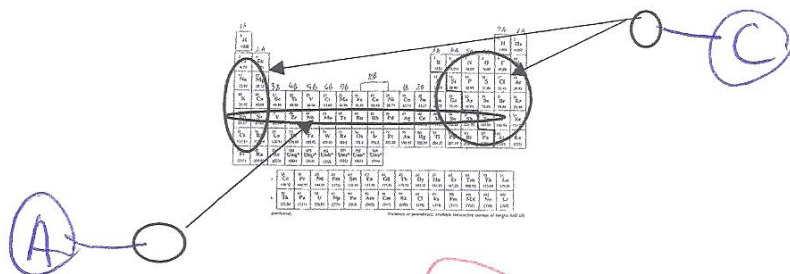
(h)   How many valence electrons ? _7_

(f) What is the likely charge on the element _−1_ (2 pts) Explain or show work. (2 pts)

   $7-8 = -1$

(g) Is the element a [(metal) or (nonmetal)]

4.   Match the following to the letters shown.   The letters may only be used one time or not at all. (8 pts total, 4 pts each)

(A) period   (B) group   (C) main group (representative elements)   (D) transition metal elements
(E) lanthanide/actinide

[red annotations: 3pt, 3pt]

5   Name the compound given below (given the element names). $Cs_2 Se$ (cesium   selenium) (6 pts)

   cesium selenide *[red: #prefix −1]*

Part III: Long Answers (30 pts) Show work on all questions for partial and full credit even on questions which do not specify.

1.   a.   During Hurricane Florence Prep, traffic on I-26 West was traveling at the rate of 25.8 miles per hour. How fast is that in kilometers per minute ? (1 mile = 5280 feet, 1 foot = 12 inches, 1 inch = 2.54 cm, 100 cm = 1 meter, 1000 meters = 1 kilometers, 60 minutes = 1 hour) (10 pts) 12 pt

$$\frac{25.8\ miles}{hour} \times \frac{5280\ feet}{1\ mile} \times \frac{12\ inches}{1\ foot} \times \frac{2.54\ cm}{1\ inch} \times$$

$$\frac{1\ meter}{100\ cm} \times \frac{1\ km}{1000\ m} \times \frac{1\ hour}{60\ min} = 0.692\ \frac{km}{min}$$

3 s.f.

BA = -6 attempt -2

b.   How long in hours will it take for you to travel 15.3 miles from work to home ? (5 pts) 3 pt

BA - 1½

$$15.3\ miles \times \frac{hour}{25.8\ miles} = 0.593\ hours\ \text{attempt} = 2$$

2.   a.   Someone made a heterogeneous mixture of gold nuggets and copper pellets.   (density of gold is 19.32 g / mL., density of copper is 896 g / mL)   If you know that you added 2.5 quarts of the gold (to make the heterogeneous mixture), what is the volume of the gold nuggets in the heterogeneous mixture in mL. (1 liter = 1.06 quarts, 1000 mL = 1 Liter) (10 pts) 12 pt

$$2.5\ quarts\ gold \times \frac{1\ l}{1.06\ quarts} \times \frac{1000\ ml}{1\ l} = 2358.5$$

2 s.f.

BA = -6
attempt -2

$$2.4 \times 10^{3}\ ml\ gold$$

b.   If the ratio of gold to ~~zinc~~ copper in the heterogenous mixture is 1:1 by volume, what is the mass of the ~~zinc~~ copper in the heterogenous mixture ? (5 pts) 3 pt

Copper   BA = -1½ attempt -½ Copper

$$2.4 \times 10^{3}\ ml\ gold \times \frac{1\ ml\ Cu}{1\ ml\ gold} \times \frac{8.96\ g\ Cu}{ml\ Cu} = 2.2 \times 10^{4}\ g\ Cu$$