

Name Key (print) Name _____ (sign)

Please show work for partial credit and full credit on the Short Answer Questions. Multiple choice questions have no partial credit. Please write anything you want graded legibly. If you run out of space, continue on the empty back pages but clearly label where the remaining answers can be found. (Please count your exam pages and make sure there are 4 pages)

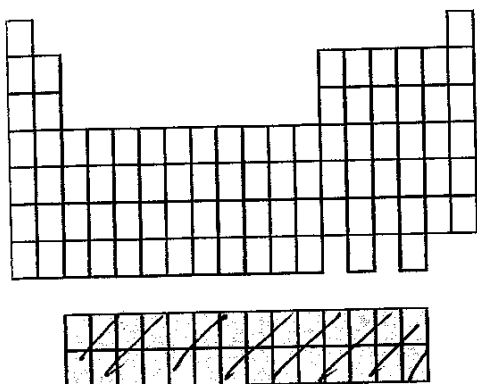
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) What is the chemical symbol for manganese?
 A) Na B) Mn

C) Mg D) Hg

1) B

- 2) What group of elements does the shaded area in the following periodic table indicate?



- A) alkali metals
 C) inner transition metals

B) alkaline earth metals
 D) transition metals

2) C

- 3) Na₂O is named
 A) sodium oxygen.
 C) sodium oxide.

B) sodium(II) oxide.
 D) sodium dioxide.

3) C

- 4) Which of the compounds, Ca H₂, H₂O, C H₄, XeF₄ are ionic compounds?
 A) only Ca Cl₂
 C) only C H₄

B) Ca Cl₂ and Xe F₄
 D) H₂O, C H₄, and XeF₄

4) A

- 5) How many significant figures are there in the answer for the following problem?

$$23.1 + 0.5848 + 11 = ?$$

A) one

B) two

C) three

D) four

5) B

- 6) Iron (Fe) is an example of
 A) a compound. B) an ion.

C) an element.

D) a mixture.

6) C

- 7) All of the following elements are nonmetals except
 A) oxygen. B) hydrogen. C) carbon. D) beryllium. 7) D
- 8) The formula for dinitrogen trioxide is
 A) N_3O_2 . B) $N(OH)_3$. C) $(NO_3)_2$. D) N_2O_3 . 8) D
- 9) Elements in a periodic group have similar
 A) densities. B) masses. 9) D
 C) physical properties. D) chemical properties.
- 10) The chemical formula for the nitrate ion is
 A) N^{3-} . B) NO_3^- . C) NO_2^- . D) N^{2-} . 10) B
- 11) A sailor circumnavigated the earth and covered 4,264,000 meters. Express this number in standard scientific notation.
 A) $4.264 \times 10^{-7} \text{ m}$ B) $4.264 \times 10^6 \text{ m}$ C) $4.264 \times 10^7 \text{ m}$ D) $4.264 \times 10^{-6} \text{ m}$ 11) B
- 12) Which of the following two atoms are isotopes?
 A) $^{40}_{18}\text{Ar}$ and $^{40}_{20}\text{Ca}$ B) $^{12}_6\text{C}$ and $^{13}_6\text{C}$ 12) B
 C) $^{24}_{12}\text{Mg}$ and $^{12}_6\text{C}$ D) $^{35}_{17}\text{Cl}$ and $^{80}_{35}\text{Br}$
- 13) How many electrons are in a neutral atom of iodine-131?
 A) 54 B) 53 C) 1 D) 131 13) B
- 14) What symbol is used to express the factor, 10^{-3} ?
 A) μ B) m C) n D) M 14) B
- 15) The solid compound, Na_3PO_4 , contains
 A) Na^+ , P^{3-} , and O^{2-} ions. B) Na_3PO_4 covalent molecules. 15) C
 C) Na^+ ions and PO_4^{3-} ions. D) Na_3^+ and PO_4^{3-} ions.

Part II: Short Answers

Please show work on all questions for partial credit even on questions which do not specify. (40 total pts)

1. (a) Give the name of the element Mg magnesium (2 pts)

(b) Give the symbol for the element sodium (2 pts) Na

2. **kilo** means 10 raised to what power 10^3 (don't forget sign) (3 pts)

sign - 1/2

3. Significant Figures: Give the answer to the correct # of significant figures. (2 pts)

92.800 - 1.2 = 91.6

S.f. - 1

4. For the element P answer the following (1 pt each blank, 9 pts total)

a) How many protons 15 b) How many electrons for the neutral atom 15

c) Give the symbol in the format ${}^A_Z X$ for the same element ${}^{31}_{15} P$ ↑ - 1/2

d) What group is the element in 5A e) What period is the element in 3

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

h) what is the atomic mass 30.97 (for these don't forget units) amu i) what is the mass of one mole of the element 30.97 g unit - 1/2

j) how many atoms are in one mole of the element 6.022×10^{23}

5.(a) How many moles are in 823.5 grams of the element Mg ? (show work) (4 pts) 24.31
(attempt)
-2

1 mol mg = 24.31 g mg

823.5 g mg x $\frac{1 \text{ mol mg}}{24.31 \text{ g mg}} = 33.87$

(b) How many atoms are in the sample above ? (show work) (4 pts)

823.5 g mg x $\frac{1 \text{ mol mg}}{24.31 \text{ g mg}} \times \frac{6.022 \times 10^{23} \text{ atoms mg}}{1 \text{ mol mg}} =$

6 Circle all ionic compounds (6 pts)

- (MgCl₂) SO₂ NO₂ (K₂Se) CCl₄ PCl₃

2.040 x 10²⁵
graded OK if wrong @ but did @ OK

7 ionic compounds (5 pts)

What is the charge for Ca ? +2 (1 pt) What is the charge for N -3 (1 pt)
gp. #2 gp. # 5 S-8 = -3

What is the formula for the Ca and N ? (show work) (3 pts)



8. Name the following (4 pts total, 2 pts each)

FeCl₃ iron (III) chloride

← chlorine + ide

1/2 pt

1 pt each part

NO₂ nitrogen dioxide

covalent use # prefix -di

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MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) How many significant figures are there in the answer for the following problem? *pink*

1) B

$$23.1 + 0.5848 + 11 = ?$$

- A) one B) two C) three D) four

2) What symbol is used to express the factor, 10^{-3} ?

2) A

- A) m B) n C) μ D) M

3) Elements in a periodic group have similar

3) D

- A) masses. B) densities.
C) physical properties. D) chemical properties.

4) Which of the compounds, CaH_2 , H_2O , CH_4 , XeF_4 are ionic compounds?

4) A

- A) only CaCl_2 B) only CH_4
C) CaCl_2 and XeF_4 D) H_2O , CH_4 , and XeF_4

5) All of the following elements are nonmetals except

5) A

- A) beryllium. B) hydrogen. C) oxygen. D) carbon.

6) How many electrons are in a neutral atom of iodine-131?

6) D

- A) 1 B) 131 C) 54 D) 53

7) The chemical formula for the nitrate ion is

7) A

- A) NO_3^- . B) NO_2^- . C) N^{2-} . D) N^{3-} .

8) What is the chemical symbol for manganese?

8) D

- A) Hg B) Mg C) Na D) Mn

9) Which of the following two atoms are isotopes?

9) A

- A) ${}^{12}_6\text{C}$ and ${}^{13}_6\text{C}$ B) ${}^{24}_{12}\text{Mg}$ and ${}^{12}_6\text{C}$
C) ${}^{40}_{18}\text{Ar}$ and ${}^{40}_{20}\text{Ca}$ D) ${}^{35}_{17}\text{Cl}$ and ${}^{80}_{35}\text{Br}$

Part II: Short Answers

Please show work on all questions for partial credit even on questions which do not specify. (40 total pts)

1. (a) Give the name of the element Br bromine (2 pts)

(b) Give the symbol for the element sulfur (2 pts) S

2. milli means 10 raised to what power -3 (don't forget sign) (30 pts)

3. Significant Figures: Give the answer to the correct # of significant figures. (2 pts)

$92.800 * 1.2 = 111.36 \rightarrow 2 \text{ sig figs } 110 \text{ or } 1.1 \times 10^2$

4. For the element K answer the following (1 pt each blank, 9 pts total)

a) How many protons 19 b) How many electrons for the neutral atom 19

c) Give the symbol in the format ${}^A_Z X$ for the same element ${}^{39}_{19} K$

d) What group is the element in 1A e) What period is the element in 4

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

h) what is the atomic mass 39.10 i) what is the mass of one mole of the element 39.10g
(for these don't forget units) amu

j) how many atoms are in one mole of the element 6.022×10^{23}

5.(a) How many moles are in 72.92 grams of the element C ? (show work) (4 pts)

$$1 \text{ mol C} = 12.01 \text{ g}$$

$$72.92 \text{ g C} \times \frac{1 \text{ mol C}}{12.01 \text{ g C}} = 6.072 \text{ mol}$$

(b) How many atoms are in the sample above ? (show work) (4 pts)

$$72.92 \text{ g C} \times \frac{1 \text{ mol C}}{12.01 \text{ g C}} \times \frac{6.022 \times 10^{23} \text{ atoms C}}{1 \text{ mol C}} =$$

6 Circle all covalent compounds (6 pts)



$$3.656 \times 10^{24} \text{ atoms of C}$$

7 Ionic Compounds (5 pts total)

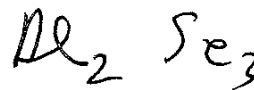
What is the charge for Al ? +3 (1 pt) What is the charge for Se -2 (1 pt)

gp. 3

gp. 6

$$6 - 8 = -2$$

What is the formula for the Al and Se ? (show work) (3 pts)



8. Name the following (4 pts total, 2 pts each)

SF₆ sulfur hexa fluoride

covalent - use a prefix fluorine ~~ide~~

CaSO₄ calcium sulfate

↳ sulfate

Name key (print) Name _____ (sign)

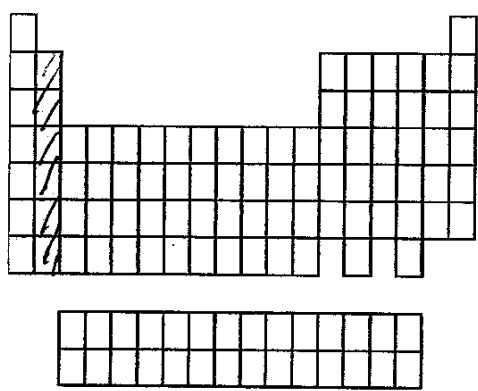
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MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The chemical formula for the carbonate ion is
 A) C^- . B) CO^- . C) CO_3^{2-} . D) CO_2^{2-} . 1) C

2) Water is an example of
 A) a compound. B) a mixture. C) an ion. D) an element. 2) A

3) What group of elements does the shaded area in the following periodic table indicate? 3) B



- A) alkali metals B) alkaline earth metals
 C) halogens D) noble gases

4) What is the chemical symbol for gallium?
 A) Ge B) Na C) Al D) Ga 4) D

5) Which group 1A element is **not** a metal?
 A) K B) Cs C) Be D) H 5) D

6) Na_2O is named
 A) sodium(II) oxide. B) sodium oxide.
 C) sodium oxygen. D) sodium dioxide. 6) B

- 7) How many significant figures are there in the answer to the following problem? 7) D
 $(8.881 \times 2.100) + 0.590 = ?$ 18.6501 + 0.590 = 19.2401
 A) one B) two C) three D) four
- 8) What is the chemical formula for iron(II) phosphate? 8) B
 A) Fe_3P_4 B) $\text{Fe}_3(\text{PO}_4)_2$ C) Fe_2PO_4 ~~D) Fe_2P~~
 Fe^{+2} PO_4^{-3}
- 9) The solid compound, Na_2CO_3 , contains 9) B
 A) Na_2CO_3 molecules. B) Na^+ ions and CO_3^{2-} ions.
 C) Na_2^+ and CO_3^{2-} ions. D) Na^+ , C^{4+} , and O^{2-} ions.
- 10) What type of bonding is found in the compound PCl_5 ? 10) D
 A) ionic bonding B) metallic bonding
 C) hydrogen bonding D) covalent bonding
- 11) Elements in a periodic group have similar 11) B
 A) densities. B) chemical properties.
 C) masses. D) physical properties.
- 12) How many electrons are in a neutral atom of iodine-131? 12) C
 A) 1 B) 54 C) 53 D) 131
- 13) Which of the following represent isotopes? 13) C
 A: ${}_{26}^{56}[\]$ B: ${}_{27}^{56}[\]$ C: ${}_{26}^{55}[\]$ D: ${}_{28}^{58}[\]$
 A) A and B B) C and D C) A and C D) A and D
- 14) The formula for dinitrogen trioxide is 14) A
A) N_2O_3 . B) $\text{N}(\text{OH})_3$. C) N_3O_2 . D) $(\text{NO}_3)_2$.
- 15) The factor 0.01 corresponds to which prefix? 15) D
 A) deci B) milli C) deka D) centi

Part II: Short Answers

Please show work on all questions for partial credit even on questions which do not specify. (40 total pts)

1. (a) Give the name of the element Co cobalt (2 pts)

(b) Give the symbol for the element **phosphorus** (2 pts) P

2. **centi** means 10 raised to what power -2 (don't forget sign) (3 pts)

3. Significant Figures: Give the answer to the correct # of significant figures. (2 pts)

$$102.2 - 92.723 = 9.477 \quad 9.5$$

column

4. For the element Cs answer the following (1 pt each blank, 9 pts total)

a) How many protons 55 b) How many electrons for the neutral atom 55

c) Give the symbol in the format ${}^A_Z X$ for the same element ${}^{133}_{55} Cs$

d) What group is the element in 1A e) What period is the element in 6

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

h) what is the atomic mass 132.91 i) what is the mass of one mole of the element 132.91g
(for these don't forget units) amu

j) how many atoms are in one mole of the element 6.022×10^{23} atoms

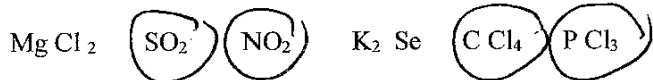
5.(a) How many moles are in 16.234 grams of the element Na ? (show work) (4 pts)

$$1 \text{ mol Na} = 22.99 \text{ g Na}$$
$$16.234 \text{ g Na} \times \frac{1 \text{ mol Na}}{22.99 \text{ g Na}} = 0.7061$$

(b) How many atoms are in the sample above? (show work) (4 pts)

$$16.234 \text{ g Na} \times \frac{1 \text{ mol Na}}{22.99 \text{ g Na}} \times \frac{6.022 \times 10^{23} \text{ Na atoms}}{1 \text{ mol Na}} = 4.252 \times 10^{23}$$

6 Circle all covalent compounds (6 pts)



$$4.252 \times 10^{23}$$

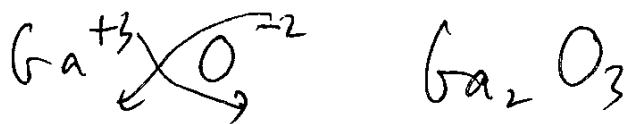
7. Ionic Compounds (5 pts)

What is the charge for Ga ? +3 (1 pt) What is the charge for O -2 (1 pt)

group 3A

group 6A 6 - 8 = -2

What is the formula for the Ga and O ? (show work) (3 pts)



8. Name the following (4 pts total 2 pts each)

Na₃ PO₄ sodium phosphate
ionic

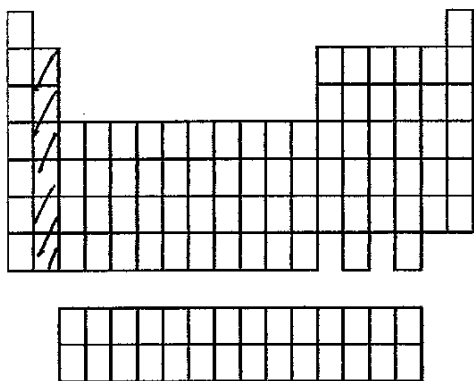
Mn O₂ manganese (IV) oxide
ionic - transition metal

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MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) The chemical formula for the carbonate ion is pink
 A) CO^- B) CO_2^{2-} C) C^- D) CO_3^{2-} 1) D
- 2) What is the chemical symbol for gallium?
 A) Ga B) Ge C) Al D) Na 2) A
- 3) The factor 0.01 corresponds to which prefix?
 A) deka B) milli C) deci D) centi 3) D
- 4) What type of bonding is found in the compound PCl_5 ?
 A) ionic bonding B) metallic bonding
 C) hydrogen bonding D) covalent bonding 4) D
- 5) What group of elements does the shaded area in the following periodic table indicate? 5) B



- A) alkali metals B) alkaline earth metals
 C) halogens D) noble gases
- 6) The formula for dinitrogen trioxide is
 A) $\text{N}(\text{OH})_3$ B) N_3O_2 C) N_2O_3 D) $(\text{NO}_3)_2$ 6) C
- 7) The solid compound, Na_2CO_3 , contains
 A) Na^+ ions and CO_3^{2-} ions. B) Na_2CO_3 molecules.
 C) Na^+ , C^{4+} , and O^{2-} ions. D) Na_2^+ and CO_3^{2-} ions. 7) A

- 8) Elements in a periodic group have similar
 A) physical properties. B) masses.
 C) densities. D) chemical properties. 8) D
- 9) How many electrons are in a neutral atom of iodine-131?
 A) 54 B) 53 C) 131 D) 1 9) B
- 10) Na₂O is named
 A) sodium(II) oxide. B) sodium dioxide.
 C) sodium oxygen. D) sodium oxide. 10) D
- 11) Water is an example of
 A) a mixture. B) a compound. C) an element. D) an ion. 11) B
- 12) What is the chemical formula for iron(II) phosphate?
 A) Fe₂P B) Fe₃P₄ C) Fe₃(PO₄)₂ D) Fe₂PO₄ 12) C
- 13) How many significant figures are there in the answer to the following problem?
 (8.881 × 2.100) + 0.590 = ?
 A) one B) two C) three D) four 13) D
- 14) Which of the following represent isotopes?
 A: $\begin{matrix} 56 \\ 26 \end{matrix} []$ B: $\begin{matrix} 56 \\ 27 \end{matrix} []$ C: $\begin{matrix} 55 \\ 26 \end{matrix} []$ D: $\begin{matrix} 58 \\ 28 \end{matrix} []$
 A) A and D B) C and D C) A and B D) A and C 14) D
- 15) Which group 1A element is **not** a metal?
 A) K B) H C) Cs D) Be 15) B

Part II: Short Answers

Please show work on all questions for partial credit even on questions which do not specify. (40 total pts)

1. (a) Give the name of the element Ni nickel (2 pts)

(b) Give the symbol for the element vanadium (2 pts) V

2. **deci** means 10 raised to what power -1 (don't forget sign) (3pt)

3. Significant Figures: Give the answer to the correct # of significant figures. (2 pts)

$102.2 * 92.723 =$ 9476.2906 4 sig → 9476

4. For the element Se answer the following (1 pt each blank, 9 pts total)

a) How many protons 34 b) How many electrons for the neutral atom 34

c) Give the symbol in the format ${}^A_Z X$ for the same element ${}^{79}_{34} Se$

d) What group is the element in 6A e) What period is the element in 4

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

h) what is the atomic mass 78.96 i) what is the mass of one mole of the element 78.96g
(for these don't forget units) amu

j) how many atoms are in one mole of the element 6.022×10^{23}

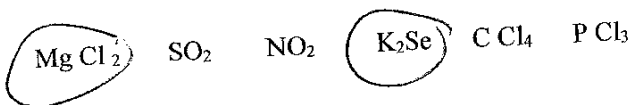
5.(a) How many moles are in 90.229 grams of the element F $\frac{18.998}{?}$ (show work) (4 pts)

$$90.229 \text{ g} \times \frac{1 \text{ mol F}}{18.998 \text{ g F}} = 4.7494 \text{ mol F}$$

(b) How many atoms are in the sample above? (show work) (4 pts)

$$90.229 \text{ g F} \times \frac{1 \text{ mol F}}{18.998 \text{ g F}} \times \frac{6.022 \times 10^{23} \text{ atoms}}{1 \text{ mol F}} = 2.8601 \times 10^{24}$$

6 Circle all ionic compounds (6 pts)



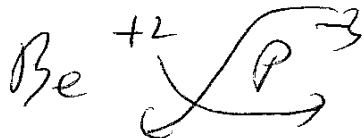
7. Ionic Compounds (5 pts)

What is the charge for Be ? $+2$ (1 pt) What is the charge for P -3 (1 pt)

gp. 2A

gp. 5A $5 - 8 = -3$

What is the formula for the Be and P ? (show work) (3 pts)



8. Name the following (4 pts total, 2 pts each)

SO_2 sulfur dioxide
covalent

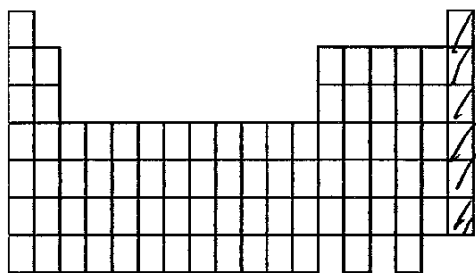
SnCl_2 tin (II) chloride
ionic (variable charge)

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MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) What symbol is used to represent the factor 10^{-2} ? 1) B
 A) μ **(B)** c C) M D) n
- 2) Na_2S is named 2) B
 A) sodium disulfide. **(B)** sodium sulfide.
 C) sodium(II) sulfide. D) sodium sulfur.
- 3) The chemical formula for the carbonate ion is 3) C
 A) CO_2^{2-} . B) CO^- . **(C)** CO_3^{2-} . D) C^- .
- 4) Which is the correct formula of the binary fluoride of element B? 4) C
 A) BF_5 B) BF_6 **(C)** BF_3 D) BF_2 - 303
- 5) How many protons (p) and neutrons (n) are in an atom of $^{90}_{38}\text{Sr}$? 5) B
 A) 38 p, 90 n **(B)** 38 p, 52 n C) 52 p, 38 n D) 90 p, 38 n 38p 38e
- 6) What group of elements does the shaded area in the following periodic table indicate? 6) D
 $90 - 38 = 52n$



- A) alkali metals B) alkaline earth metals
 C) halogens **(D)** noble gases

- 7) What is the chemical formula for strontium hydroxide? (Sr = Strontium) 7) C
A) SrH₂ B) SrOH₂ C) Sr(OH)₂ D) SrOH
- 8) Elements in a periodic group have similar 8) D
A) densities. B) physical properties.
C) masses. D) chemical properties.
- 9) What is the identity of the element with 6 protons, 7 neutrons, and 6 electrons? 9) C
A) Mg B) Al C) C D) N
- 10) What is the chemical formula for nickel(II) phosphate? 10) C
A) Ni₂P B) Ni₂PO₄ C) Ni₃(PO₄)₂ D) Ni₃P₂
- 11) Convert 0.009723 to standard scientific notation. 11) A
A) 9.723 × 10⁻³ B) 9723 × 10⁶ C) 9.723 × 10³ D) 9723 × 10⁻⁶
- 12) Which of the compounds, Na₃P, PH₃, C₂H₆, IBr₃, are ionic compounds? 12) B
A) PH₃, C₂H₆, and IBr₃ B) only Na₃P
C) Na₃P and PH₃ D) only C₂H₆
- 13) All of the following elements are nonmetals except 13) B
A) phosphorus. B) copper. C) nitrogen. D) krypton.
- 14) What is the chemical symbol for potassium? 14) C
A) Po B) Hg C) K D) P
- 15) Coffee with cream and sugar is an example of 15) D
A) an element. B) a compound. C) an ion. D) a mixture.

Part II: Short Answers

Please show work on all questions for partial credit even on questions which do not specify. (40 total pts)

1. (a) Give the name of the element Li lithium (2 pts)

(b) Give the symbol for the element fluorine (2 pts) F

2. **milli** means 10 raised to what power -3 (don't forget sign)

3. Significant Figures: Give the answer to the correct # of significant figures. (2 pts)

$822.5 - 1.2348 = 821.2652$
column
821.3

4. For the element Sr answer the following (1 pt each blank, 9 pts total)

a) How many protons 38 b) How many electrons for the neutral atom 38

c) Give the symbol in the format ${}^A_Z X$ for the same element ${}^{38}_{38} Sr$

d) What group is the element in 2A e) What period is the element in 5

g) Is the element a metal or (nonmetal)

h) what is the atomic mass 87.62 i) what is the mass of one mole of the element 87.62g
(for these don't forget units) amu

j) how many atoms are in one mole of the element 6.022×10^{23}

4.(a) How many moles are in 6.29 grams of the element Li ? (show work) (4 pts)

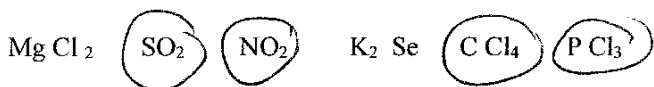
Li 6.94g

$$1 \text{ mol Li} = 6.94 \text{ g Li}$$
$$6.29 \text{ g Li} \times \frac{1 \text{ mol Li}}{6.94 \text{ g Li}} = 0.906 \text{ mol}$$

(b) How many atoms are in the sample above? (show work) (4 pts)

$$6.29 \text{ g Li} \times \frac{1 \text{ mol Li}}{6.94 \text{ g Li}} \times \frac{6.022 \times 10^{23} \text{ atoms}}{1 \text{ mol Li}} =$$

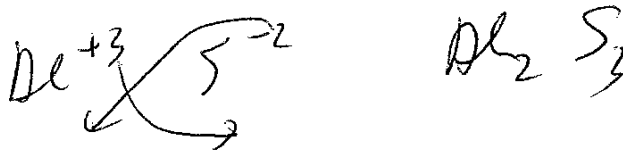
5 Circle all covalent compounds (6 pts)



6 ionic compounds (5 pts total)

What is the charge for Al ? +3 (1 pt) What is the charge for S -2 (1 pt)

What is the formula for the Al and S ? (show work) (3 pts)



7. Name the following (4 pts total, 2 pts each)

SiO₂ silicon dioxide

P Cl₃ phosphorus trichloride