

Name Key (print) Name _____ (sign)

Please show work for partial credit on the Long Answers and in some of the Short Answer Questions. Multiple choice questions have no partial credit. Please write anything you want graded legibly. If I cannot read your work, I obviously cannot grade it. (2 pts print AND sign exam)

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 total)

- NA = not attempted BA = bad attempt
N.W. = no work*
- 1) How many oxygen atoms are there in one formula unit of $\text{Ca}_3(\text{PO}_4)_2$? 1) B
 A) 4 B) 8 C) 2 D) 6
- 2) Which of the following pairs is incorrect? 2) A
 A) carbon oxide, CO_2 B) sulfur hexafluoride, SF_6
 C) sulfur dioxide, SO_2 D) iodine trichloride, ICl_3
- 3) You have a sample of zinc (Zn) and a sample of aluminum (Al). You have an equal number of atoms in each sample. Which of the following statements concerning the masses of the samples is true? 3) C
 A) The mass of the aluminum sample is more than twice as great as the mass of the zinc sample.
 B) The masses of each sample are equal.
 C) The mass of the zinc sample is more than twice as great as the mass of the aluminum sample.
 D) The mass of the zinc sample is more than the mass of the aluminum sample, but it is not twice as great.
- 4) Which metals form cations with varying positive charges? 4) C
 A) Group 2 metals B) Group 1 metals
 C) transition metals D) Group 3 metals
- 5) Which of the following names is incorrect? 5) B
 A) diphosphorus pentoxide B) aluminum(III) oxide
 C) magnesium oxide D) cobalt(II) chloride
- 6) The correct name for FeO is 6) C
 A) iron monoxide B) iron(I) oxide
 C) iron(II) oxide D) iron oxide
- 7) Which of the following are *incorrectly* paired? 7) B
 A) chlorine, Cl B) Phosphorus, Pr
 C) calcium, Ca D) sulfur, S

Part II: Short Answers (41 pts) Show work on all questions for partial and full credit even on questions which do not specify.

1. Name the following. (9 pts, 3 pts each)

PO_4^{3-} phosphate

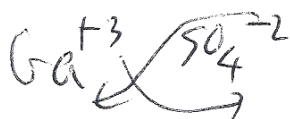
HBr hydrobromic acid

Prefix for 8 octa

BA - 1 1/2
acid

2. For the following, write out the formula for the neutral compound. Explain or show work for charges on elements and explain how you came up with the formula. (10 pts)

Ga & SO_4^{2-} $\text{Ga}_2(\text{SO}_4)_3$ Ga group 3 so Ga^{+3}



attempt -2

BA = -5

NW = -3

$$(\# \text{Ga})(+3) + (\# \text{SO}_4^{2-})(-2) = \text{zero}$$

3. Circle those which are covalent (12 pts, 2 pts each)

Na_2O

PCl_3

Ba_3N_2

SO_2

CO_2

CaBr_2

4. Name the following. (10 pts)

PCl_3

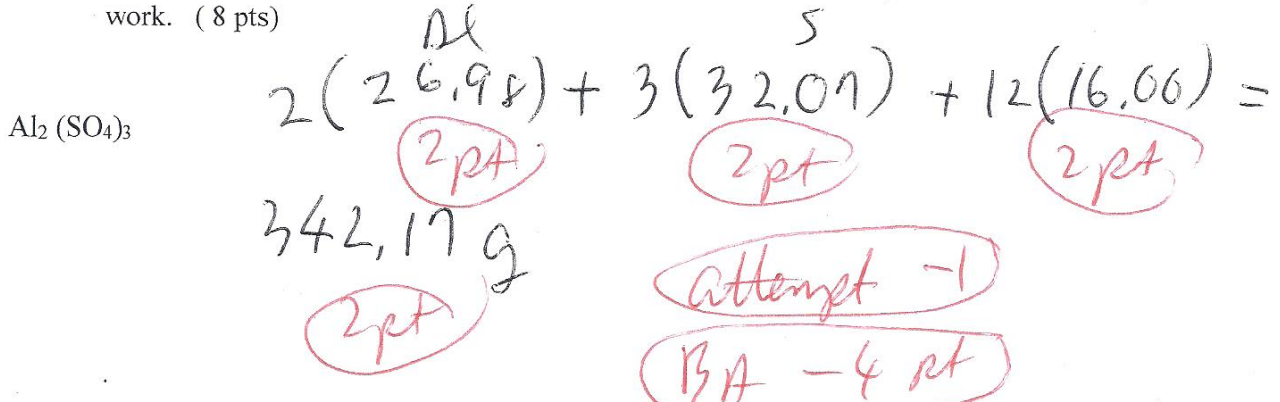
phosphorus trichloride

chlorine ide

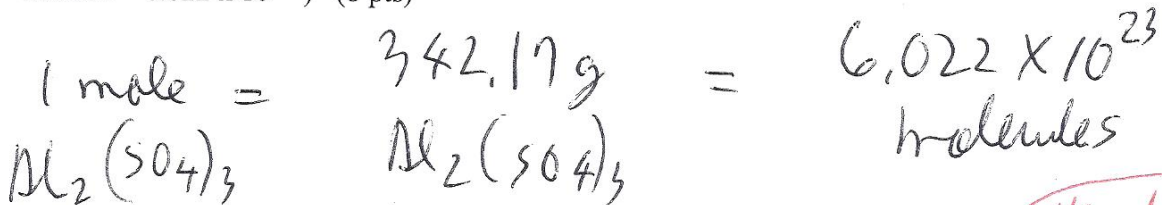
-1

Part III: Long Answer (36 pts) Show work for partial credit and full credit even on questions which do not specify.

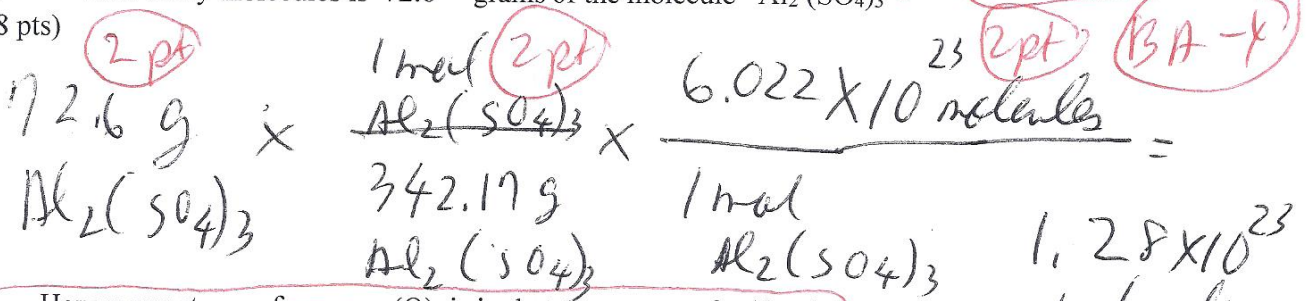
1. Given the formula shown, what is the molar mass (molecular weight, formula mass, etc). Show work. (8 pts)



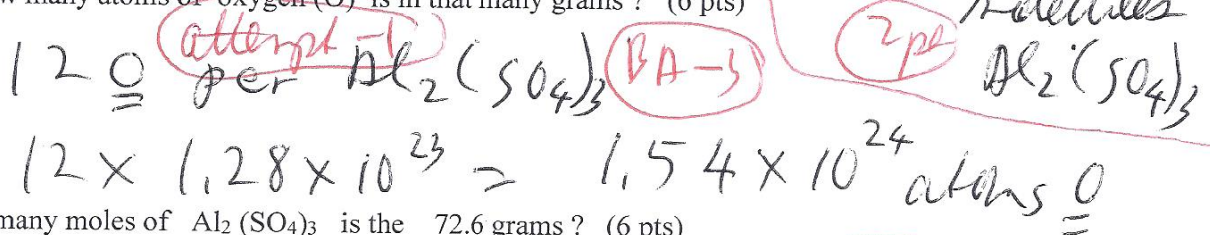
2. Give the definition of the mole relating mass, mole and Avogadro's number ? (Avogadro's number = 6.022×10^{23}) (8 pts)



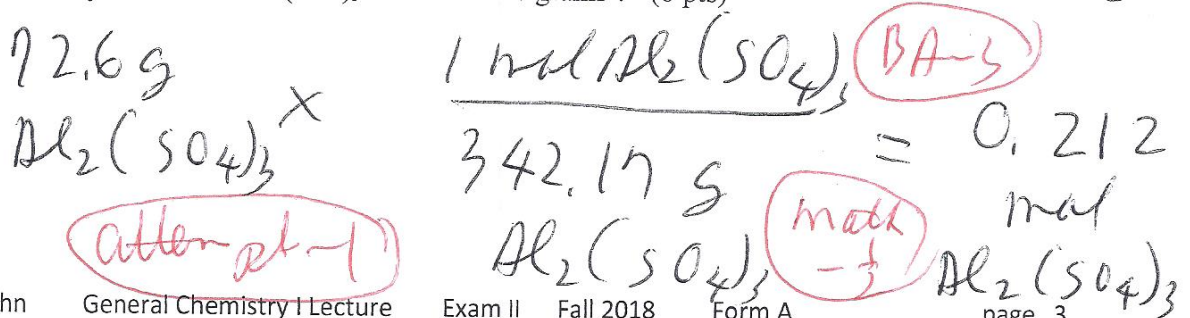
3. How many molecules is 72.6 grams of the molecule Al₂(SO₄)₃ (8 pts)



4. How many atoms of oxygen (O) is in that many grams? (6 pts)



5. How many moles of Al₂(SO₄)₃ is the 72.6 grams? (6 pts)



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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 total)

- NA = not attempted* *BA = bad attempt*
NW = NO WORK
- How many oxygen atoms are there in one formula unit of $\text{Ca}_3(\text{PO}_4)_2$? 1) C
 A) 2 B) 6 C) 8 D) 4
 - Which of the following are *incorrectly* paired? 2) C
 A) calcium, Ca B) sulfur, S
 C) Phosphorus, Pr D) chlorine, Cl
 - Which of the following pairs is incorrect? 3) D
 A) iodine trichloride, ICl_3 B) sulfur dioxide, SO_2
 C) sulfur hexafluoride, SF_6 D) carbon oxide, CO_2
 - You have a sample of zinc (Zn) and a sample of aluminum (Al). You have an equal number of atoms in each sample. Which of the following statements concerning the masses of the samples is true? 4) C
 A) The mass of the aluminum sample is more than twice as great as the mass of the zinc sample.
 B) The masses of each sample are equal.
 C) The mass of the zinc sample is more than twice as great as the mass of the aluminum sample.
 D) The mass of the zinc sample is more than the mass of the aluminum sample, but it is not twice as great.
 - Which metals form cations with varying positive charges? 5) A
 A) transition metals B) Group 3 metals
 C) Group 2 metals D) Group 1 metals
 - Which of the following names is incorrect? 6) D
 A) diphosphorus pentoxide B) cobalt(II) chloride
 C) magnesium oxide D) aluminum(III) oxide
 - The correct name for FeO is 7) B
 A) iron oxide B) iron(II) oxide
 C) iron monoxide D) iron(I) oxide

Part II: Short Answers (41 pts) Show work on all questions for partial and full credit even on questions which do not specify.

1. Name the following. (9 pts, 3 pts each)

SO_4^{2-} sulfate

BA - 1 1/2 each

HI hydroiodic acid

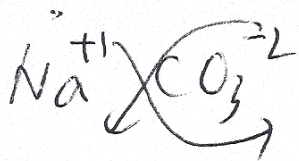
Prefix for 5 penta

2. For the following, write out the formula for the neutral compound. Explain or show work for charges on elements and explain how you came up with the formula. (10 pts)

Na & CO_3^{2-} Na_2CO_3

Na in group 1

Na^{+1}



Attempt - 2 BA = -5 NW = -3

$$(\overset{2}{\# \text{Na}})(+1) + (\overset{1}{\# \text{CO}_3})(-2) = \text{zero}$$

3. Circle those which are ionic (12 pts, 2 pts each)

Na_2O

PCl_3

Ba_3N_2

SO_2

CO_2

CaBr_2

4. Name the following. (10 pts)

Na_2O

ionic so

no # prefix
oxygen + ide

sodium oxide

1

BA = -5 Attempt - 2

Part III: Long Answer (36 pts) Show work for partial credit and full credit even on questions which do not specify.

1. Given the formula shown, what is the molar mass (molecular weight, formula mass, etc). Show work. (8 pts)

$Ba_3(PO_4)_2$

Ba (2pt) P (2pt) O (2pt)

$$(137.33)3 + (30.97)2 + (16.00)8 =$$

$$601.93 \text{ g/mol}$$

attempt -1

2. Give the definition of the mole relating mass, mole and Avogadro's number? (Avogadro's number = 6.022×10^{23}) (8 pts)

1 mol $Ba_3(PO_4)_2$ = 601.93 g $Ba_3(PO_4)_2$ = 6.022×10^{23} molecules $Ba_3(PO_4)_2$

attempt -1

3. How many molecules is 230.5 grams of the molecule $Ba_3(PO_4)_2$ (8 pts)

230.5 g $Ba_3(PO_4)_2$ \times $\frac{1 \text{ mol } Ba_3(PO_4)_2}{601.93 \text{ g } Ba_3(PO_4)_2}$ \times $\frac{6.022 \times 10^{23} \text{ molecules } Ba_3(PO_4)_2}{1 \text{ mol } Ba_3(PO_4)_2}$ =

2pt 2pt 2pt

BA = -4

4. How many atoms of oxygen (O) is in that many grams? (6 pts)

8 O per molecule

2.31 $\times 10^{23}$ molecules

$$8(2.31 \times 10^{23}) = 1.84 \times 10^{24} \text{ atoms O}$$

BA -3

attempt -1

5. How many moles of $Ba_3(PO_4)_2$ is the 230.5 grams? (6 pts)

230.5 g $Ba_3(PO_4)_2$ \times $\frac{1 \text{ mol } Ba_3(PO_4)_2}{601.93 \text{ g } Ba_3(PO_4)_2}$ = 0.383 moles $Ba_3(PO_4)_2$

BA -3

attempt -1

math 1/2