

College of Industrial Technology
King Mongkut's University of Technology North Bangkok



Final Examination of Semester 1

Year: 2014

Subject: 392151 Chemistry I

Section: 15 -16

Date: 12 December 2014

Time: 10.00-12.00

Name: _____ ID: _____ Class: _____

Instructions:

1. Cheating will result in failure of all classes registered for the current semester. Students who are caught cheating will also be denied registering for the following semester.
2. No documents are allowed to be taken out of the examination room.
3. Two line display calculators are allowed in the examination
4. This exam is a closed book examination.
5. Electronic communication devices are not allowed in the examination room.
6. The examination has 6 pages (including this page), 3 sections and a total score of 50 points.
7. Write all your solution and answer on this examination sheet

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Score	Part 1	Part 2	Part 3	Total

<http://www.webelements.com/>

[illegible]

***lanthanoids**

actinoids

Symbols and names of the elements, and their spellings are those recommended by the International Union of Pure and Applied Chemistry (IUPAC - <http://www.iupac.org/>). Names have yet to be proposed for the most recently discovered elements 110–112 and 114 so those used here are IUPAC's temporary systematic names. In the USA and some other countries, the spellings aluminium and caesium are normal while in the UK and elsewhere the common spelling is sulphur.

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The numeric system (1–18) used here is the current IUPAC convention.

Atomic weights (mean relative masses): Apart from the heaviest elements, these are the IUPAC 2001 values and given to 5 significant figures. Elements for which the atomic weight is given within square brackets have no stable nuclides and are represented by the element's longest lived isotope.

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Part 1 Multiple Choice (15 points)

Choose the letter of the choice in the answer table that best completes the statement or answers the question.

Question no.	a.	b.	c.	d.
1				
2				
3				
4				
5				

Question no.	a.	b.	c.	d.
6				
7				
8				
9				
10				

1. Calculate the mass of 1.00 mol of SCl_2 .

- a. 51 amu b. 51 g c. 103 amu d. 103 g

2. How many moles of hydrogen atoms are present in 1.25 mol of CH_4 ?

- a. 4 mol b. 5 mol c. 7 mol d. 8 mol

3. Which of the following has the greatest relative molecular (formula) mass?

- a. Fe b. H_2SO_4 c. Na_2O d. $\text{Zn}(\text{NO}_3)_2$

4. Which of the following has the greatest number of atoms?

- a. 1 atom b. 1 mol of He c. 1 mol of atom $\div (6.02 \times 10^{23})$ d. 1 mol of NH_3

5. Calculate the number of molecules of SO_2 in 2 mol of SO_2 .

- a. 3.86×10^{23} b. 4.01×10^{23} c. 6.02×10^{23} d. 1.204×10^{23}

6. Which of the following metal samples have the greatest mass?

- a. 100 g of Cu b. 4.0 mol of Fe c. 3.0 mol of Ag d. 2.0 mol of Au

7. The coefficients in a chemical equation represent the

- a. masses, in grams, of all reactants and products.
b. relative numbers of moles of reactants and products.
c. number of atoms in each compound in a reaction.
d. number of valence electrons involved in the reaction.

8. Determine percentage of hydrogen in water.

- a. 5 % b. 12 % c. 38% d. 66%

9. How many moles of CO_2 are present in a 0.56 dm^3 sample at STP?

- a. 0.025 mol b. 0.10 mol c. 0.30 mol d. 0.50 mol

10. For the reaction $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$, how many moles of oxygen are required to react with 2 mol of methane, CH_4 ?

- a. 2 mol b. 4 mol c. 10 mol d. 20 mol

Part 2 Matching (10 points)

Match the terms *below* with *definitions*, placing the appropriate letter in the space against the number.

- | | |
|------------------------|---|
| ___ 1. 1 mole | a. 1.66×10^{-24} g |
| ___ 2. 1 amu | b. 6.02×10^{23} |
| ___ 3. molar mass | c. A temperature of 0°C and a pressure of 0.987 atm |
| ___ 4. STP | d. It contains the same number of particles as there are in 12g of ^{12}C - atoms. |
| ___ 5. Avogadro number | e. The mass of each different element present in the compound |
| | f. The sum of the relative atomic masses in a compound |
| | g. The mass contains in one mole of substance |

Part 3 Write your answer in the space provided for each question (25 points)

1. Calculate the average relative atomic mass of lead (Pb) from the following data. (3 points)

Isotope	Natural Relative Abundance (%)	Relative atomic mass
^{204}Pb	1.5	203.8
^{206}Pb	23.6	205.8

Isotope	Natural Relative Abundance (%)	Relative atomic mass
^{207}Pb	22.6	206.7
^{208}Pb	52.3	207.7

2. Calculate the percentage composition by mass of C in $(\text{CH}_3)_2\text{CO}$. (2 points)

3. A compound was analyzed in the laboratory and found to contain 69.94% iron and 30.06% oxygen. Is the compound iron(II) oxide, FeO , or iron(III) oxide, Fe_2O_3 ? (2 points)

4. (a) Determine the *molecular mass* of ethanoic acid (CH_3COOH)
 (b) Determine the number of *moles of oxygen atoms* in 50.0 g of ethanoic acid
 (c) Determine the number of *hydrogen atoms* in 50.0 g of ethanoic acid (5 points)

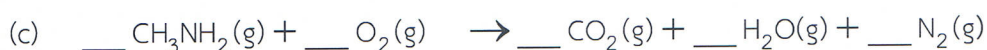
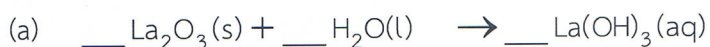
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5. (a) How many *moles* of N_2 in 42 g of N_2 ?
(b) What *volume* will 42 g of N_2 occupy at STP? (4 points)

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

6. Balance the following reactions:

(3 points)



7. The incandescent white of a fireworks display is caused by the reaction of phosphorous (P) with O_2 to give P_4O_{10} as the following unbalanced equation.

(6 points)



- (a) How many moles of O_2 are required to react with 2 mol of P?
- (b) How many grams of O_2 are needed to combine with 6.85g of P?
- (c) How many grams of P_4O_{10} can be made from 8.00g of O_2 ?

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