

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



Final Examination of Semester 1

Year: 2012

Subject: 392151 Chemistry I

Section: 15-16

Date: 28 September 2012

Time: 08.00-10.00

Name: _____ ID: _____ Field of Study: _____

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. Calculators are allowed in the examination.
 4. Dictionaries are NOT allowed.
 5. This exam is a closed book examination.
 6. No any electronic communication devices allow in the exam room.
 7. The examination has 6 pages (including this page), 2 sections and a total score of 60 points.
 8. Write all your answers on this exam sheet.
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<http://www.webelements.com/>

[illegible]

***lanthanoids**

actinoids

Symbols and names: the 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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Group labels: the numeric system (1–16) 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 (20 points)

Identify the letter of the choice that best completes the statement or answers the question.

- ___ 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 presented in 1.25 mol of CH_4 ?
 a. 4 mol b. 5 mol c. 7 mol d. 8 mol
- ___ 3. What is the empirical formula of C_5H_{10} .
 a. CH b. C_2H c. CH_2 d. C_5H_{10}
- ___ 4. Calculate the number of molecules of SO_2 in 41 g of SO_2 .
 a. 3.86×10^{23} b. 4.01×10^{23} c. 6.02×10^{23} d. 5
- ___ 5. Which of the following has the greatest number of atoms?
 a. 1 atom b. 1 mole of atom $\div (6.02 \times 10^{23})$
 c. 1 mole of He d. 1 mole of NH_3
- ___ 6. For the reaction $\text{C} + 2\text{H}_2 \rightarrow \text{CH}_4$, how many moles of hydrogen are required to produce 10 mol of methane, CH_4 ?
 a. 2 mol b. 4 mol c. 10 mol d. 20 mol
- ___ 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. In the reaction $\text{Al}_2\text{O}_3 \rightarrow \text{Al} + \text{O}_2$ (unbalanced), what is the mole ratio of aluminum to oxygen?
 a. 10:6 b. 2:3 c. 1:1 d. 4:3
- ___ 9. Determine percentage of water in $\text{Ba}(\text{OH})_2 \cdot 4\text{H}_2\text{O}$.
 a. 10% b. 20% c. 30% d. 40%
- ___ 10. A hydrocarbon sample has an empirical formula of CH and the molar mass of this compound is 78 g/mol. What is the chemical formula of this compound?
 a. CH_4 b. C_5H_{10} c. C_2H_2 d. C_6H_6

Part 2 Answer (40 points)

1. Calculate the atomic mass of lithium from the following data: (5 points)

Isotope	Natural Relative Abundance (%)	Mass (amu)
${}^6\text{Li}$	7.5	6.0151
${}^7\text{Li}$	92.5	7.0160

2. How many moles of H_2O_2 in 34 g of H_2O_2 ? How many moles of H atoms are there?

(5 points)

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3. A sample of NH_3 is pumped from a 1.50-L vessel at STP, what is its mass? How many atom of N and H in this gas?

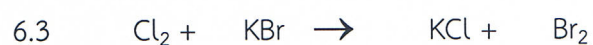
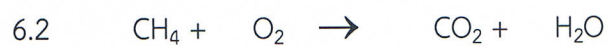
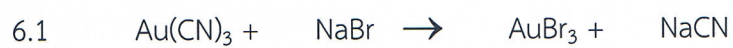
(7 points)

4. A forensic scientist analyzes a drug and finds that it contains 80.22% carbon and 9.62% hydrogen. Could the drug be pure tetrahydrocannabinol ($C_{21}H_{30}O_2$)? (6 points)

5. A sample of a hydrocarbon was found to contain 7.2 g of carbon and 1.5 g of hydrogen. The molar mass of this compound was determined to be 58 g mol^{-1} . What are the empirical formula and molecular formula of the compound? (7 points)

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6. Balance the following reactions. (4 points)



7. Given the following equation, calculate the mass of O_2 needed to react completely with

7.4 g NO.



(6 points)

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