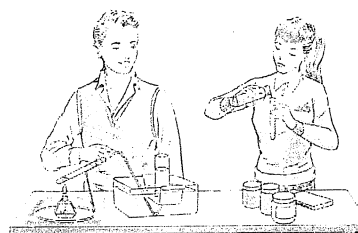


**THE OPENUNIVERSITY OF SRI LANKA**  
**PSC 1222 – BASIC CHEMISTRY FOR LABORATORY PRACTICE – 2014/2015**  
**HOME ASSIGNMENT**

- Write focused answers. Copying the answers of another person is not allowed. Such assignment answers will not be marked.
- Write the answers to all the questions in blank sheets or foolscap papers.
- Copy the relevant tables separately when you answer the questions.
- Deadline date for home assignment – 15<sup>th</sup> September, 2014.
- Submission of the home assignment should be done by mailing it (preferably by registered post) to the address given below on or before the deadline date.

Ms. D.V.D. Hemalika  
 The Co-ordinator/PSC 1222  
 Department of Chemistry  
 The Open University of Sri Lanka  
 Nawala  
 Nugegoda



- Please write your address on the back side of the last page of the answer script.

1. Considering the following elements and complete the table given below.  
 Silver, Potassium, Calcium, Bromine, Mercury, Xenon, Radium, Aluminium, Boron, Zinc

Chemical Symbol	Group	Period	Block	Physical State at room temperature & pressure	Metal/Non Metal/Metalloid

2. Oxygen has three naturally occurring isotopes. The relative abundance of each isotope is given below.

Isotope	Relative abundance (%)
<sup>16</sup> O	99.76
<sup>17</sup> O	0.038
<sup>18</sup> O	0.200

- 2.1. What is an isotope?
- 2.2. Calculate the relative atomic mass of Oxygen.
- 2.3. According to the three isotopes given above, complete the following table.

Isotope	No of electrons	No of protons	No of neutrons
<sup>16</sup> O			
<sup>17</sup> O			
<sup>18</sup> O			

2.4. Of these isotopes are the chemical properties and physical properties the same? Explain your answer.

3.

3.1. Write down the chemical formula of the compounds given in the table below and identify each of them as **Ionic** or **Covalent**.

Compound	Formula	Ionic/Covalent
pottasium oxide		
Nitrogen dioxide		
Ammonia		
Sodium sulphite		
Zinc sulphate		
Hydrochloride acid		
Formic acid		
Iron(III) sulphate		
butane		
Hydrogen sulphide		

3.1 An Alcohol has a relative molecular mass of 74.0 and has the following composition by mass; C, 64.9 %, H, 13.5% and O. (H=1, C=12, O=16)

3.1.1 What is the weight/weight percentage of oxygen (O)?

3.1.2 Find the empirical formula of the compound.

3.1.3 Find the molecular formula of the compound.

4

4.1 What are the seven primary dimensions and their SI units?

4.2 Derive the SI units of Force, Pressure and Concentration.

4.3 What is the molality of a solution of 20 g of NaOH in 500 g of water?

4.4 Write down the relationship between,

4.4.1 Fahrenheit ( $^{\circ}\text{F}$ ) and Celsius ( $^{\circ}\text{C}$ )

4.4.2 Celsius ( $^{\circ}\text{C}$ ) and Kelvin (K)

4.5 Express  $132^{\circ}\text{F}$  in Celsius and Kelvin units.

5

5.1 Define the terms "population" and "sample".

5.2 A student was asked to analyze  $\text{PO}_4^{3-}$  ions in an effluent water stream that coming out from a garment factory. He selected ten different places of the effluent water stream and collected  $50.0 \text{ cm}^3$  separately from each place and analyzed. Identify the population and the sample in this example.

5.3 Twenty students who followed the PSC 1222 course at OUSL obtained the following marks for the final examination. Calculate the following.

73, 40, 53, 65, 38, 63, 41, 79, 40, 84, 93, 23, 68, 59, 41, 31, 80, 79, 30, 92

5.3.1 Calculate the mean.

5.3.2 What is the range?

5.4 Chamila was asked to follow the procedure given below in an experiment.

"Mix  $20.50 \text{ cm}^3$  of HCl with  $25.0 \text{ cm}^3$  of KBr. Then add  $10 \text{ cm}^3$  of ethanol"

What are the suitable measuring devices that she should use for each measurement?

6

6.1 Give the chemical formula of the compounds in each pair given below and identify the more soluble compound in water in each pair?

6.1.1 Table salt and lime stone

6.1.2 Vinegar and pentane

6.1.3 Liquid Ammonia and methane gas

6.2 Write down the balanced chemical reaction between following indicating the physical status of all the reactants and the products.

6.2.1  $\text{AgNO}_3$  (aq) and  $\text{KI}$  (aq)

6.2.2  $\text{Ca}(\text{NO}_3)_2$  (aq) and  $\text{H}_2\text{SO}_4$

6.2.3  $\text{Na}_2\text{SO}_4$  (aq) and  $\text{KOH}$  (aq)

7 A student who is following the CLT course at OUSL was asked to prepare a  $250.0 \text{ cm}^3$  of  $0.0850 \text{ mol dm}^{-3}$   $\text{Na}_2\text{CO}_3$  solution. He used an impure  $\text{Na}_2\text{CO}_3$  which has the percentage of purity by weight 80%. ( $\text{Na} = 23$ ,  $\text{C} = 12$ ,  $\text{O} = 16$ )

7.1 Calculate the mass required to prepare the solution given above.

7.2 What is the weighing device that he should use in the laboratory to weigh the sample as accurately as possible.

7.3 Describe in steps, he should follow to prepare the above solution as accurately as possible stating clearly the glassware he has to use.

8 8.1.

8.1.1 What is meant by "Hazardous chemicals"?

8.1.2 Name three common Hazardous chemicals.

8.2

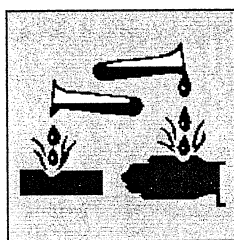
8.2.1 What are the three methods that can be used to put out a fire?

8.2.2 Give four examples for spill clean up materials.

8.2.3 What do you mean by MSDS? What information we can get from MSDS?

8.2.4 Briefly point out four good laboratory practices.

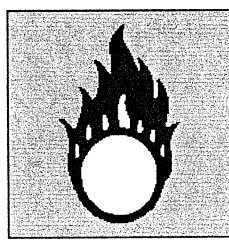
8.2.5 Identify the following symbols.



a.



b.



c.

**PSC 1222- Basic Chemistry for Laboratory Practice, 2014/2015**  
**Home Assignment - Marking Scheme**

1.

Chemical Symbol	Group	Period	Block	Physical state @ room T & p	Metal/Non metal/Metalloid
Ag	11	5	d	solid	Metal
K	1	4	s	Solid	Metal
Ca	2	4	s	Solid	Metal
Br	17	4	p	liquid	Non metal
Hg	12	6	d	liquid	Metal
Xe	18	5	p	gas	Non metal
Ra	2	7	s	solid	Metal
Al	13	3	p	solid	Metal
B	13	2	p	solid	Metalloid
Zn	12	4	d	solid	Metal

2.

2.1 Atoms having same atomic number & different mass number.

$$2.2 \text{ Atomic mass} = [99.76 \times 16 \div 100] + [0.038 \times 17 \div 100] + [0.2 \times 18 \div 100]$$

$$= 15.96 + 0.0064 + 0.036 = 16.0024$$

2.3

Isotope	No of electrons	No of protons	No of neutrons
$^{16}\text{O}$	8	8	8
$^{17}\text{O}$	8	8	9
$^{18}\text{O}$	8	8	10

2.4 Chemical properties are same because they have same number of electrons. But physical properties are different. Because isotops having different number of neutrons. It affects mass number. It defects physical properties like boiling point /melting point & density.

3.

3.1

Compound	Formula	Ionic/covalent
Pottasium oxide	$\text{K}_2\text{O}$	Ionic
Nitrogen dioxide	$\text{NO}_2$	Covalent
Ammonia	$\text{NH}_3$	Covalent
Sodium sulphite	$\text{Na}_2\text{SO}_3$	Ionic
Zinc sulphate	$\text{ZnSO}_4$	Ionic
Hydrochloride acid	$\text{HCl}$	Covalent
Formic acid	$\text{HCOOH}$	Covalent
Iron (iii) sulphate	$\text{Fe}_2(\text{SO}_4)_3$	Ionic
Butane	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$	Covalent
Hydrogen sulphide	$\text{H}_2\text{S}$	Covalent

3.2 3.2.1  $[100 - (64.9 + 13.5)] = 21.6$

3.2.2	C	H	O
	64.9/12	13.5/1	21.6/16
	5.4	13.5	1.35
	5	10	1

So empirical formula  $\text{C}_5\text{H}_{10}\text{O}$

3.2.3  $(\text{C}_5\text{H}_{10}\text{O})_n = 74$        $n=1$       So molecular formula =  $\text{C}_5\text{H}_{10}\text{O}$