



MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2012/2013

FIRST YEAR FIRST SEMESTER EXAMINATION FOR
THE DEGREE OF BACHELOR OF SCIENCE IN PUBLIC
HEALTH WITH INFORMATION TECHNOLOGY
(CITY CAMPUS)

SCH 102: BASIC INORGANIC CHEMISTRY

Date: 2nd August, 2013

Time: 11.00 a.m. – 1.00 p.m.

INSTRUCTIONS

- ◆ Answer ALL questions.
- ◆ Periodic Table is attached.



Q1(a) Name each of the following compounds:

- | | |
|--------------------------------|-----|
| i. KH_2PO_4 | 1Mk |
| ii. $\text{HBr}_{(g)}$ | 1Mk |
| iii. HBr (in water) | 1Mk |
| iv. NH_4NO_2 | 1Mk |
| v. $\text{Al}(\text{OH})_3$ | 1Mk |
| vi. KMnO_4 | 1Mk |
| vii. KNH_4SO_4 | 1Mk |

(b) Write the formulae for the following compounds:

- | | |
|--------------------------------|-----|
| i. Potassium sulphide | 1Mk |
| ii. Calcium hydrogen phosphate | 1Mk |
| iii. Boron trichloride | 1Mk |
| iv. Strontium chlorite | 1Mk |
| v. Ammonium sulphate | 1Mk |
| vi. Silver perchlorate | 1Mk |
| vii. Sodium hydrogen sulphide | 1Mk |

Q2. (a)(i) Group the following compounds as either ionic or molecular:

SiCl_4 , LiF , NaBr , BaF_2 , CCl_4 , ICl , CsCl . 4Mks

(ii) Briefly explain how an ionic bond formed 3Mks

(iii) Briefly explain how a covalent bond is formed 2Mks

(b) Write the formulae for the following ionic compounds:

(i) Copper bromide (Containing Cu^+ ion)

(ii) Manganese oxide (Containing Mn^{3+} ion)

(iii) Magnesium phosphate (Containing the PO_4^{3-} ion) 5Mks

Q3 (a) (i) Explain the meaning of each term in the symbol A_ZX 3Mks

Give the number of protons and neutrons in the nuclear of each of the following atoms:

(ii) ${}^{65}_{29}Cu$ 1Mk

(iii) ${}^{52}_{24}Cr$ 1Mk

(iv) ${}^{60}_{27}Co$ 1Mk

(v) ${}^{107}_{47}Ag$ 1Mk

(b) (i) Copy and fill in the blanks in the table below:

Symbol		${}^{54}_{26}Fe^{2+}$			
Protons	5			79	86
Neutrons	6		16	117	136
Electrons	5		18	79	
Net charge			3-		0

3Mks

(ii) Which elements are most likely to form ionic compounds? 2Mks

(iii) Which metallic elements are most likely to form cations with different charges? 2Mks

Q4 (a)(i) What is stoichiometry? 1Mk

(ii) Give a schematic diagram of a Mass Spectrometer 4Mks

(iii) Briefly explain how mass spectrometer is used to determine the atomic mass (weight) of an element 3Mks

(b) (i) What is an isotope? 1Mk

(ii) Briefly explain how the mass spectrometer is used to determine the isotopic composition of an element 2Mks

(iii) The element Magnesium (Mg) has three stable isotopes with the following masses and abundances:

Isotope	Mass (amu)	Abundance
^{24}Mg	23.9850	78.99%
^{25}Mg	24.9858	10.00%
^{26}Mg	25.9826	11.01%

Calculate the atomic weight of Magnesium that would be listed on the periodic table. 3Mks

Q5 (a)(i) What is a mole? 2Mks

(ii) Calculate the number of oxygen molecules in 35.5g of O_2 2Mks

(iii) Calculate the mass of 12.3 moles of SO_3 molecules. 2Mks

(b)(i) What is the difference between the empirical and molecular formulae of a compound? 4 Mks

(ii) A compound containing only sulphur and nitrogen is 69.9% sulphur by mass. The molar mass of the compound is 184.

Calculate (i) the empirical formula 2mks

(ii) molecular formula, of the compound. 2mks

