**EXAM**

**CHEMISTRY FORM 2**

**MARKING SCHEME**

**Instructions: Answer all the questions in the spaces provided. Show working clearly where possible**

1. a) Using dots (.) and crosses (x) to represent electrons, show the structure of carbon (ii) oxide (2mks)

b) Name the type of bonds found in the compound (2mks)

- covalent

- co-ordinate(dative)

1. Natural argon contains 0.34% of argon 36, 0.06% of argon 38 and 99.6% of argon 40. Calculate the relative atomic mass of argon. (3mks)

36x0.34 + 38x 0.06 + 40x 99.6

100 100 100

0.1224+ 0.0228+ 39.84

39.98

-~40

1. Give two reasons why luminous flame is not used for heating purposes in the laboratory (2mks)
* Produce a small amount of heat
* Produces a lot of soot
1. Explain why the pH value of hydrochloric acid is lower than that of ethanoic acid (2mks)
* It is a strong acid
* Has more hydrogen ions
1. Arrange the following elements in order of their reactivity (in descending order). Potassium (K), Calcium (Ca), Alluminium (Al) and copper (Cu) (2mks)
* Potasium (K) calcium (Ca) Aluminium (Al) Copper (Cu)
1. Differentiate between the following types of mixtures (2mks)
	1. Heterogenous
* It is a mixture in which components of the mixture can easily be distinguished eg mixture of kerosene and water
	1. Homogenous
* It is a mixture in which components of the mixture cannot be easily be distinguished eg mixture of water and milk
1. Explain the following terms (5mks)
	1. Solvent
* It is a liquid in which solute dissolves in
	1. Solute
* It is a solid which dissolves in a liquid
	1. Melting point
* It is temperature at which solid changes to lipuid
	1. Boiling
* It is a change from liquid state to gas state at a particular temperature
	1. Sublimation
* It is a change from solid state to gas state at a particular temperature
1. An element P has an electron arrangement of 2.6
	1. State the period and group which the element belongs (2mk)
		1. Period
		* 3
		1. Group

VI

* 1. Write the formula of the most stable ion formed when element P ionizes (1mk)

P2-

* 1. Explain the difference between the atomic radius and ionic radius of the element P (1mk)
* Ionic radius is greater than the atomic radius due to repulsion caused by increase in electrons in the outermost occupied energy level
1. Name the elements present in lead (ii) sulphate and their chemical symbols
* Lead (Pb)
* Sulphur (S)
* Oxygen (O)
1. Study the set-up below and answer the questions that follow:
	1. Name gas (1mk)
* hydrogen
	1. Give the test for the gas (1mk)
* Burns with ‘’pop’’ sound in air
	1. Give the name for the resulting solution (1mk)
* Calcium hydroxide
	1. Write an equation for the reaction that takes place in the set-up (2mks)
* Calcium + water calcium hydroxide +hydrogen gas

Or

Ca(s) + H2O(l) Ca(OH)2(aq) + H2 (g)

1. Complete and balance the equations below
	1. ZnO(s) +2HCl(aq) ZnCl2(aq) + H2O(l)
	2. 2Mg(s) + O2(g) 2Mg(s)
	3. CuCO3(s) heat CuO(s) + CO2(g)
	4. CaCO3(s) +HCl(aq CaCl2(aq) + CO2(g) + H2O (l)
2. Study the information in the table below and answer the questions that follow. (The letters do not represent the actual symbols of the element)

|  |  |  |
| --- | --- | --- |
| Element | Electronic configuration | Ionization energy |
| P | 2.1 | 519 |
| Q | 2.8.1 | 494 |
| R | 2.8.8.1 | 418 |

* 1. What is meant by ionization energy? (2mk)
* It is the minimum energy required to remove an electron from the outermost energy level of an atom in the gaseous state.
	1. What is the general name given to the group in which element P, Q and R belong? (1mk)
* Alkali metals
	1. Explain why element R has the least ionization energy (2mk)
* Nucleus has the least influence on the electrons due to big atomic radius
1. An element has 16 protons and 16 neutrons. What is:-
	1. The mass number of the element X? (1mk)

16+16= 32

* 1. The charge on the most stable ion of element? (2mks)

2-

1. Write the chemical formula of the following compounds
	1. Alluminium hydroxide (2mks)

Al(OH)3

* 1. Iron (ii) nitrate (2mks)

Fe(NO3)2

* 1. Ammonium sulphate (2mks)

(NH3)2SO4

* 1. Barium chloride (2mks)

BaCl2

1. Explain the following observations:
	1. Chlorine is more reactive that bromine (2mks)

It is more electronegative

* 1. Potassium is more reactive than lithium (2mks)

Its outermost electron is loosely held and therefor easily lost

1. a) Name two reagents used during the laboratory preparation of oxygen (2mks)

Hydrogen peroxide

Sodium peroxide

Potassium chlorate

b) Write and equation for this reaction (2mk)

1. the apparatus in the figure below could be used to show the products of combustion of a candle:

Ice cold water

 To sanction pump

limewater

Inverted

funnel

Candle

* 1. What is the function of the sanction pump? (1mk)

To remove the unreacted oxides of carbon (traces of CO)

* 1. Why is tube M surrounded by cold water in a beaker? (1mk)

To condense the water produced in the reaction

* 1. Explain the changes you expect in the lime water (1mk)

White precipitate is formed

* 1. Write a chemical equation of the reaction in the test tube containing limewater (3mks)

Ca(OH)2(aq) + CO2(g) CaCO3 (s) CaCO3(s)+ H2O (l)

1. Given the formula of aluminum sulphate as Al2(SO4)3 and that of lead (ii) nitrate as Pb(NO3)2. What would be the formula of aluminum nitrate? (3mks)

In Al2(SO4)3valency of aluminium is 3

In Pb(NO3)2valency of nitrate is 1

Formula of aluminium nitrate is Al(NO3)3

1. In the set up below, nitrogen gas is prepared. Study it well and answer the questions that follow

water

Conc. Sodium hydroxide

Copper turnings

Heat

N2

Air

 T

* 1. What is the purpose of NaOH? (1mk)

To remove carbon (iv) oxide

* 1. Write an equation of the reaction taking place in the round bottomed flask. (3mks)

2NaOH(aq) + CO2(g)  NaCO3(aq) +H2O (l)

* 1. With the aid of an equation, explain what takes place in the combustion tube (2mks)

Copper is oxidized to copper (ii) oxide

2Cu(s) +O2(g) CuO(s)

* 1. The nitrogen obtained using this method is not pure. Explain (3mks)

It has traces of unreacted oxygen and rare gases

1. a) What is meant by an indicator? (2mks)

it is a substance which show different colours when in acid and base

1. Name any two indicators and give their colours in an acid solution. (2mks)

|  |  |
| --- | --- |
| Indicator | Colour in acid |
| Phenolphthalein  | Colourless |
| Methyl orange | Orange |
| Litmus solution | red |

1. Name the method by which the following mixtures could be separated (4mks)
	1. Kerosene from crude oil

Fractional distilation

* 1. Coloured extract from grass dissolved in propanone

Chromatography

* 1. Pure iodine from a mixture of sand and iodine

Sublimation

* 1. Solute from solvent

Simple distilation

1. Give an example of each of the following oxides: (4mks)
	1. Basic oxide

Calcium oxide ( any oxides of metals)

* 1. Neutral oxide

Water

* 1. Acidic oxide

Sulphur (iv) oxide ( oxides of non metals)

* 1. Amphoteric oxide

Zinc oxide

Lead oxide

Alluminium oxide

1. Substances exist as pure elements and compounds. Give two examples for each and write their chemical symbols (formula for compounds)

|  |  |  |
| --- | --- | --- |
| Elements | Name | Symbol |
| I potassium | K |
| Ii Sodium | Na |
| Compound | Name | Formula |
| I Copper (ii) oxide | CuO |
| Ii Calcium Carbonate | CaCO3 |