**ELERAI MCK GIRLS SECONDARY SCHOOL**

**EXAM 1 TERM III 2014**

**FORM 2**

**CHEMISTRY**

1. Calcium carbonate reacts with dilute sulphuric acid to form some products.

(i) Write an equation for the above reaction (1 mk)

(ii) Why would the above reactants not be suitable for preparation of the above gas? (2mks)

2. Excess magnesium ribbon sample was heated in equal volumes of:-

(i) Pure oxygen gas

(ii) Air

(a) Why was the mass of the resulting product in (ii) more than in (i)? (1 mark)

(b) Write the equations for the reactions in part (ii) (2 marks)

3. The set up below was used to prepare dry hydrogen gas. Study it and answer the questions that follow.

Cardboard

Hydrochloric

acid

Zinc granules

Liquid Y

(i) Is the method of collecting the gas correct? Give a reason. (1 mark)

(ii) What would be liquid Y? (1 mark)

(iii) Give two physical properties of hydrogen gas (1 mark)

(iv) What is the chemical test for hydrogen gas (1mk)

4. Study the information tabulated below to answer the questions that follow

**Melting point Element Atomic number**

**97.8 P 11**

**1441 Q 14**

**-42 X 17**

**64 Y 19**

1. Write the electron arrangement of the

(i) Atom of Y (½ mark)

(ii) Ion of X (½ mark)

1. Compare the ionic radius of Y with its atomic radius (2 marks)

5. A student lowered burning magnesium in a gas jar of carbon (IV) oxide as shown in the diagram.

Magnessium

ribbon

Gas jar

CO2

(a) State and explain the observation made in the gas jar (2 marks)

6. (a) Using a dot (•) and cross (x) to represent the outer most electrons, draw diagrams to show the

bonding in magnesium sulphide. (2 marks)

(b) State the structure of the above compound. (1 mark)

(c) Give two properties of substances with the above structure (2 mark)

7. Given sodium carbonate solid, lead (II) nitrate solid and water, explain how you can obtain a solid

sample of Lead (II) carbonate. (3 marks)

8.The flow diagram below shows the process of obtaining nitrogen by fractional distillation. Use it to answer the following questions.

CO2

O2

H2O

N2

O2

H2O

N2

H2O

N2

Process P

Process Q

N2

Conc.

H2SO4

(a) What is the purpose of the processes P and Q. (2 marks)

(b) Identify the reagents used in processes P and Q (2 marks)

(d) Give two uses of oxygen (2 marks)

(e) Give an impurity that could be found in the nitrogen gas obtained above. (1 mark)

9.(a) The grid below represents part of the periodic table. Study the information and answer the questions that follow. The letters do not represent the actual symbol of the elements.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| C |  |  |  |  |  |  |  |  |
| H |  | W |  | T |  | R | Y | F |
|  | E |  | S |  |  |  | Z |  |
| M | I |  |  |  |  |  |  |  |

(i) Which element would form a trivalent cation? (1mark)

(ii) Write the equation for the reaction that would occur between E and Y. (1mark)

(iii) Which elements belong to the region labelled W (1mk)

(iv) Which is the most reactive non-metallic element in the table above? Explain (2mks)

(v) How does the atomic radius of T compare with that of Y (2 marks)

10.The electron arrangement of ions X3+ and Y2- are 2,8 and 2,8,8 respectively.

(a) In which groups do X and Y belong to. (1 mark)

(b) State the atomic numbers of X and Y. (1 mark)

11.The diagram below shows the arrangement used in the laboratory during preparation of oxygen gas.

H2O

W

Water

Oxygen

(i) Name the substance labeled W. (1 mark)

(ii) Write an equation showing the preparation of oxygen in the above arrangement. (1 mark)

12.The table below shows solutions and their PH values.

|  |  |
| --- | --- |
| Solution | PH value |
| P | 2.0 |
| R | 7.0 |
| S | 14.0 |

1. Select two solutions that would react with zinc hydroxide. (2mks)
2. Explain your answer (1 marks)

13.Study the table below and answer the questions that follow.

|  |  |  |
| --- | --- | --- |
| **Element** | **Atomic radii (nm)** | **Ionic radii (nm)** |
| **Flourine** | 0.071 | 0.136 |
| **Chlorine** | 0.099 | 0.181 |
| **Bromine** | 0.114 | 0.195 |

(a) Explain why

(i) Atomic radius increases from fluorine to bromine (2 marks)

(ii) The ionic radius is larger than the atomic radius. (2 marks)

14.A student set-up the experiment below to collect gas K. The glass wool was heated before heating the zinc powder.

Glass wool

Soaked

with water

Boiling tube

Gas K

Zinc powder

Heat

Heat

1. Why was it necessary to heat the moist glass wool before heating the zinc powder? (1 mark)

(b) What observation was made in the boiling tube. (1 mark)

(c) Identify gas K. (1 mark)

15.The table below gives some properties of compounds P, Q, R and S.

|  |  |  |  |
| --- | --- | --- | --- |
| **Compound** | **B.P (0C)** | **M.P (0C)** | **Conductivity in water** |
| P | 77 | -22 | Does not conduct |
| Q | 74 | -19 | Does not conduct |
| R | -161 | -85 | Conducts |
| S | 2407 | 714 | Conducts |

(a) Which of the compounds in the table is ionic? Explain your answer. (2mks)

(b) Select the compound that is a liquid at room temperature. Explain your answer. (2mks)

16.A wooden splint was slipped through a region of a particular flame in the laboratory and was burnt as shown in the diagram below.

Unburned part

Burned part

(a) Name the type of flame the splint was slipped through (1 mark)

(b) Explain why the splint was burnt the way is shown in the diagram. (2 marks)

17.A student set up the apparatus shown below to prepare and collect dry carbon (IV) oxide gas.

Dilute HCL acid

Calcium

Carbonate

Conc. H2SO4(l)

Water

(a) State a correction for two mistakes in the set up above. (3 marks

b) State two uses of CO2 (2mks)

1. The table below shows liquids that are miscible and those that are immiscible.

|  |  |  |
| --- | --- | --- |
| Liquid | Y | Z |
| W | Miscible | miscible |
| X | Miscible | Immiscible |

b) Use the above information to answer the questions that follow.

(i) Name the method that can be used to separate W and Y from a mixture of the two (1 mk)

(ii) Describe how a mixture of X and Z can be separated. (2 marks)

(d) Crude oil is a source of many compounds that contain carbon and hydrogen only.

(i) Name the processes used to separate components of crude oil. (1 mark)

(ii) On what physical property of the above components does the separation depend? (1 mark)

(a)Define an isotope. (1mark)

(b)Determine the number of neutrons in 17X (1mark)

8

18.In an experiment a test-tube full of chlorine water was inverted in chlorine water as shown in the diagram and the set-up left in sunlight for one day.

Chlorine water

Sunlight

After one day a gas was found to have collected in the test-tube.

(a) Identify the gas. (1mark)

1. What will happen to the PH of the solution in the beaker after one day? Give an explanation. (2marks)

b) In order, name the first two alkaline earth metals and write their electron arrangement. (6 mks)

name symbol

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |