**GATITU MIXED SECONDARY SCHOOL**

**FORM 2 CHEMISTRY AUGUST HOME ASSIGNMENT**

**INSTRUCTIONS: All questions and answers should be written at the back of the exercise book. (No question should be left unanswered)**

1. An element “H” consist of isotopes of mass “10” and “11” with a percentage composition of 18.7% and 81.3% respectively. Determine the RAM of H.

The table below gives the atomic numbers of elements W X Y and Z. The letters

do not represent the actual symbols of the elements.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element | W | X | Y | Z |
| Atomic numbers | 9 | 10 | 11 | 12 |

a) Which one of the elements is less reactive? Explain. (2mks)

b) i) Which two elements would react most vigorously with each other

ii) Give the formula of the compound formed when elements in b (i) above react (1mk)

2.

The table below gives the energy required to remove the outer most electrons from same group

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Elements | I | II | III | IV |
| Energy kj /Mole | 494 | 418 | 519 | 376 |

Arrange the electrons in the order of their reactivity starting with the most reactive. (2mks)

3.

The information below relates to elements s, T, U, and x. The letters do not represent the actual symbols of the elements.

i) “T” displaces “X” from aqueous solution containing ions of “X”

ii) Hydrogen gases reduces heated oxide of “s” but does not reduce the heated oxide of “X”\

iii) “U” liberates hydrogen gas from cold water but “T” does not

a) Write an equation for the reaction between “T” and ions of “X” both T and X are in the group II of the periodic table (1mk)

b) Arrange the elements in order of their increasing reactivity (1mk)

4.

The electronic structures for elements represented by letters A, B, C, and D are:-

A= 2, 8, 6 B= 2, 8, 2 C= 2, 8, 1 D= 2, 8, 8

a) Select the element which forms

i) Double charged cation (1mk)

ii) A soluble carbonate (1mk)

b) Which element has the smallest atomic radius (1mk)

5.

The information in the table below relates to elements in the same group of the periodic table. Study it and answer the questions that follows:-

|  |  |
| --- | --- |
| Elements | Atomic size (mm) |
| G1 | 0.19 |
| G2 | 0.23 |
| G3 | 0.15 |

Which element has highest ionization energy? Give a reason. (3mks)

6. The oxides of elements “A” and “B” have the properties shown in the table below. The letters do not represent actual symbols of the elements.

|  |  |
| --- | --- |
| A | B |
| A gas at room temperature | Solid normal temperature |
| Dissolves in water to form acidic solution | Dissolves in water to form alkaline solution |

Give one example of element “A” and “B” (2mks)

7.

An oxide of F has the formula F2O5

a) Determine the oxidation state of “F” (1mk)

b) In which group of the periodic table is element “F” (1mk)

8.Yellow phosphorus reacts with chlorine gas to form a yellow liquid. The liquid fumes when exposed to air. Explain these observations. (2mks)

9. 2003

Explain why the reactivity of group (VII) elements decreases down the group.

(3mks)

10. The atomic numbers of element “C” and “D” are 19 and 9 respectively. State and explain the electro conductivity of compound CD in:-

a) Solid state (1 ½ mark)

b) Aqueous state (1 ½ mark)

11. a) Explain why the metals magnesium and aluminium are good conductors of electricity. (1mk)

b) Other than cost, give two reasons why aluminium is used for making electric cables while magnesium is not. (2mks)

12.

The table below gives information on four elements represented by letters K, L, M and N. Study it and answer the questions that follow. The letters do not represent the actual symbols of the elements.

|  |  |  |  |
| --- | --- | --- | --- |
| Elements | Electron arrangement | Atomic radius (nm) | Ionic radius |
| K | 2,8,2 | 0.136 | 0.065 |
| L | 2,8,7 | 0.099 | 0.181 |
| M | 2,8,8,1 | 0.099 | 0.181 |
| N | 2,8,8,2 | 0.174 | 0.099 |

a) Which two elements have similar chemical properties? Explain (2mks)

b) What is the most likely formula of the oxide of “L” (1mk)

c) Which element is a non-metal? Explain (2mks)

d) Which one of the elements is the strongest reducing agent? Explain (2mks)

e) Explain why the ionic radius of “N” is less than that of “M” (2mks)

f) Explain why the ionic radius of “L” is larger than its atomic radius. (2mks)

13.Study the information given in the table below and answer the questions that follow. The letters do not represent the actual symbols of elements.

|  |  |  |
| --- | --- | --- |
| Elements | Atomic numbers | Boiling point |
| S | 3 | 1603 |
| T | 13 | 2743 |
| U | 16 | 718 |
| V | 18 | 87 |
| W | 19 | 1047 |

a) Select the element which belong to the same

i) Group (1mk)

ii) Period (1mk)

b) Which element

i) is in gaseous state at room temperature? Explain (2mks)

Take room temperature to be 298K

ii) Does not form oxides (1mk)

c) Write the:-

i) Formula of the nitrate of element T (1mk)

ii) Equation for the reaction between element “S” and “U” (1mk)

d) What type of bond would exist in the compound formed when element “U” and “T” react? Give a reason for your answer (2mks)

e) The aqueous sulphate of element “w” was electrolyzed using inert electrodes. Name the products formed at the

i) Cathode (1mk)

ii) Anode (1mk)

14. The table below shows some properties of chlorine, bromine and iodine.

|  |  |  |  |
| --- | --- | --- | --- |
| Elements | Formulae | Colour and state at room temperature | Solubility in water |
| Chlorine | Cl2 | (i)………. | Soluble |
| Bromine | Br2 | Brown liquid | (ii)……… |
| Iodine | I2 | (iii) ………… | Slightly soluble |

a) Complete the table below by giving the missing information in (i) (ii)

(3mks)

b) Chloride is prepared by reacting concentrated hydrochloric acid with Manganese (IV) oxide.

i) Write the equation for the reaction between concentrated hydrochloric acid and manganese (IV) oxide.

ii) What is the role of manganes (IV) oxide in this reaction (1mk)

c) i) Iron (ii) chloride reacts with chlorine gas to form substance “E”. Identify substance “E” (1mk)

ii) During the reaction in c (i) above, 6.30g of iron (II) chloride were converted to 8.06g of substance “E”. Calculate the volume of chlorine gas used. (Cl=35.5) molar gas at room temperature = 24000 cm3 (Fe= 56) (3mks)

d) Draw and name the structure of the compound formed when excess chlorine gas is reacted with ethane gas. (2mks)

Structure…………………………………..

Name …………………………………….

15. The grid below represents part of the periodic table. Study it and answer the questions that follows:- The letter given do not represent the actual symbols of the elements.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | A |  |  |
|  | B |  |  | C |  | D |  | E |  |
| F | G |  | |  |  |  |  |  |  |
|  |  |  | |  |  |  |  | H |  |

i) Select the element that can form an ion with a change of-2. Explain your answer. (2mks)

ii) What type of structure would the oxide of C have? Explain your answer.

(2mks)

iii) How does reaction of H compare with that of E? (2mks)

iv) 1.3g of “B” react completely when heated with 1.21 litres of Cl2 (g) at STP. (1 mole of gas of STP occupies 22.4 litres)

I) Write a balanced equation for the reaction between B and Cl2(1mk)

Ii) Determine the relative atomic mass of B. (2mks)

v) Explain how you would expect the following to compare.

a) Atomic radii of “F” and “G” (1mk)

b) The pH values of aqueous solution of oxides of B and D. (2mks)

vi) The table below shows some physical properties of some substances. Use the information in the table to answer the questions that follow:-

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  | Electrical conductivity |
| Substances | Melting | Boiling point 0C | Solid | Solid |
| U | 1083 | 2595 | Good | Good |
| V | 801 | 1413 | Poor | Good |
| W | 5.5 | 80.1 | Poor | Poor |
| X | -114.8 | -84.9 | Poor | Poor |
| Y | 3550 | 4827 | Poor | poor |

i) Which substance is likely to be (1mk)

(I) A metal (1mk)

(II) Liquid at room temperature (1mk)

ii) Which substance is likely to have the following structures?

(I) Simple molecular (1mk)

(II) Giant atomic (1mk)

16. Lithium, sodium and potassium belong to the same group of the periodic table

i) Arrange the elements in the order of increasing ionization energy. (1mk)

ii) Explain the trend in 2(i) above (2mks)

17. When heated in a current of Nitrogen gas, magnesium reacts to form a compound magnesium nitride, Mg3N2

a) Calculate a volume of Nitrogen at s.t.p required to react with 8g of magnesium (Mg= 24) molar gas volume at s.t.p= 22.4 dm3) (3mks)

b) Magnisium Nitrite reacts with water to form magnesium hydroxide and ammonia. Calculate the volume of ammonia produced at S.T.P, if all magnesium nitride formed reacts completely with water. (3mks)

18. A student at Loreto Secondary school used 2g of calcium to prepare hydrogen gas in the laboratory. He used the set up below.



a) Write a chemical equation for the reaction that produced hydrogen (1mk)

b) Calculate the volume of hydrogen produced at room temperature (molar gas volume= 24,000cm3) (2mks)

c) Explain why the same method cannot be used to prepare hydrogen using sodium in the laboratory (2mks)

d) Explain why the same method cannot be used to prepare hydrogen using sodium in laboratory (2mks)

e) Calculate the mass of the products formed if all the hydrogen produced in this experiment was burnt in excess air. (3mks)

f) Explain how calcium is able to conduct electricity (2mks)

19. The table below gives atomic and mass numbers of some elements represented by letters “T” to “Y”. The letters are not actual symbols of elements. Use it to answer questions that follows:-

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Elements | T | U | V | W | X | Y |
| Atomic numbers | 1 | 18 | 1 | 19 | 20 | 17 |
| Mass numbers | 2 | 39 | 1 | 39 | 40 | 35 |

a) Which element has the lowest ionization energy? (2mks)

b) Element “V” is uniquely positioned in the periodic table. It has a tendency of forming compounds by either gaining or sharing electrons. Give the formula of a compound of “V” that is formed when V gain an electron. (1mk)

20. When magnesium metal burn metal burn in air. It reacts with both oxygen and Nitrogen gases giving a white ash- like substances. Write two equations for the two reactions that take place. (2mks)

21. Chlorine and iodine are elements in the same group in the periodic table. Chlorine gas is yellow while iodine solution is brown.

a) What observations would be made if chlorine gas is bubbled through aqueous sodium iodide? Explain using an ionic equation. (1mk)

b) Under certain conditions chlorine and iodine react to give iodine trichloride (LCl3 (s)) . What type of bonding would you expect to exist in iodine trichloride? Explain. (1mk)

22.It is not appropriate to refer to group VIII elements as “inert gases” Explain giving an example. (2mks)

23. What observations will you make when chlorine gas is bubbled through

i) Potassium bromide (1mk)

ii) Potassium chloride (1mk)

iii) Explain these observations (3mks)

24. Explain why the reactivity of group (VIII) elements decreases down the group.(3mks)