**NAME:………………………………………………………..ADM:………………………CLASS:……….**

**CHEMISTRY FORM 2**

**MID TERM I EXAM , 2021**

**TIME: 1HR 20 MIN**

**INSTRUCTIONS**

* ***Answer all questions in the spaces provided***
* ***All working must be clearly shown.***

1. Explain how you would obtain a pure Ammonium chloride from a mixture of Lead sulphate and Ammonium chloride. (3mks)

* **Place the mixture into a beaker and cover with a watch glass containing cold water.**
* **Heat the mixture gently. Ammonium chloride will dissociate gently. Ammonium chloride will dissociate into NH3 and Hcl that will recombine to form NH4cl.**

1. State and explain the changes in mass that occur when the following are heated separately in open crucibles. Write a chemical equation for each reaction.
2. Lead metal. (2mks)

* **Lead metal will increase in mass because of combines in oxygen from air.**

**2pb(s) + O2(g) 2PbO(s)**

1. Lead carbonate. (3mks)

* **Lead carbonate will reduce in mass because of decomposes to lead oxide and carbon(iv) oxide.**

**Pbco3(s) PbO(s) + Co2(g)**

1. Explain why a mixture of copper (II) oxide and magnesium reacts when heated while there is no reaction when a mixture of copper and magnesium oxide is heated. (3mks)

* **Mg has a higher affinity for combined oxygen than copper hence removes oxygen from the CuO. Cu us below Mg in the reactivity series hence cannot reduce MgO.**

1. An element x has an electronic configuration of 2. 8. 5.
2. State the period and group which the element belongs. (2mks)

* **Period 3, group V**

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

* **X3-**

1. Explain the difference between the atomic radius of element x and its ionic radius. (2mks)

-**the ionic radius is larger because of the electron- electron repulsion between the existing electrons and the added electron.**

1. (i) Explain why the metals such as Magnesium and Aluminum are good conductors. (2mks)

* **They have delocalized electrons**

(ii) State two reasons why Aluminum is preferred to Magnesium for Magnesium for making cooking pans. (2mks)

* **Al has more delocalized electrons than Mg**
* **Al has a coat of Oxygen**

1. Define the following terms:
2. Atomic Number (1mk)

* **The number of protons in the nucleus of an atom**

1. Mass Number (1mk)

**Sum of protons and neutrons in an atom of an element.**

1. The Isotopes (1mk)

**These are atoms of the same element having the same atomic number but different mass number**

1. Ionization energy (1mk)

**Minimum energy required to remove an electron from the outermost energy level of an atom in the gaseous state.**

1. Electron affinity. (1mk)

**Refers to the ability of an atom to gain an electron in a gaseous state.**

1. Atoms of element x exist as 14X and 12 X

6 6

1. What name is given to the two types of atoms. (1mk)

**Isotope**

1. Use dot (.) and (x) diagrams to illustrate the atomic structure of x. (2mks)

x

1. Write the electron configuration of the atom in (b) hence write the formula of the compound formed when it combines with oxygen (O=8) (2mks)

**X 2.4**

**X xO2**

1. The following table gives a summary of same properties of elements P, Q, R and S. the letters do not represent the actual symbols of the elements. Study the table and answer the question that follows.

|  |  |  |
| --- | --- | --- |
| element | Electron arrangement | valency |
| P  Q  R  S | 2.2  2.7  2.8.2  2.8.8.2 | 2  1  2  2 |

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

**P R & S. They have some No. of electrons in their outermost energy level.**

1. What is the must likely formular of a carbonate of S ? (1mk)

**SCO3**

1. (i) Identify the element which is a non- metal. (1mk)

**Q**

(ii) With an explanation, state the family and period to which the element in (i) belong. (3mks)

**Halogens, has seven electrons in outermost energy level, period 2 has two occupied energy levels**

1. (a) What is meant by chemical family of elements. (1mk)

**They are elements in the periodic table with the same number of electrons on the outermost energy level that predicts physical and chemical properties.**

(b) Explain the following observations.

(i) Atomic radii generally decrease across a period. (2mks)

**There is an increase in the nuclear charge across the period due to an increase in the no. of protons**

(ii) Melting points increase from sodium to Aluminium in the third period. (2mks)

**Aluminium has a small size, the packing of the atoms is closer than in sodium due to an increased nucler charge attractions**

(iii) Sodium is more reactive than magnesium. (2mks)

* **Na has low ionization energy than Mg**
* **Na reacts by losing one elctron while Mg reacts by two electrons**

(iv) Chlorine is more reactive than sulphur (2mks)

* **Cl reacts by gaining one electron while sulphur reacts by gaining 2 electrons**
* **Chlorine has a higher electron affinity than sulphur since both are non - metals**

1. Write equations for the following reactions
2. Burning magnesium in air.

**2mg (s)+ O2(g) 2mgO (s)**

1. Reaction of
2. Magnesium with steam

**Mg + H2O (g) MgO(s) + H2(g)**

1. Sodium oxide with water M

**Na2O(s) + H2O 2NaoH (aq)**

1. Aluminium with dilute sulphuric acid

**2Al(s) + 3H2S O4(aq) Al2(SO4)3(aq) + 3H2(g)**

1. Sulphur with oxygen

**S (g) + O2(g)  SO2**