NAME…………………………………ADM NO…………DATE…………………

**KISIRIRI SECONDARY SCHOOL**

**P.O. BOX 93-20500 TEL 0721-451-691**

**CAT ONE OF 3ND TERM 2013**

**FORM THREE**

**CHEMISTRY**

**ONE HOUR**

**1. The following are atomic and ionic radii (nm) of a number of elements in the same group of**

 **periodic table.**

|  |  |  |
| --- | --- | --- |
| **Elements** | **Atomic radii(nm)** | **Ionic radii (nm)** |
| **X** | **0.064** | **0.136** |
| **Y** | **0.099** | **0.181** |
| **W** | **0.114** | **0.195** |
| **Z**  | **0.133** | **0.216** |

**The letters do not represent the actual symbols of the elements.**

**(a) Is this group metallic to non-metallic elements? Explain (2mks)**

 **…………………………………………………………………………………………………**

**(b) Which element is the strongest oxidizing agent? (1mk)**

 **2. Use the scheme below to answer the questions that follow:**

Solid **X**

Gas **Y**

Moist red litmus paper

Turns blue

Carbon (IV) oxide

Colourless liquid **L**

Na2O2

Gas **Z** + colourless solution

Heat

**(a) Identify; (i) Solid X …………………………………………………………………….**

**(ii) Gas Z…………………………………………………………………….**

**(iii) Gas Y………………………………………………………………….. (3mks)**

**(b) State the chemical test for liquid L (1mk)**

 **………………………………………………………………………………………………………………**

 **…………………………………………………………………………………………………**

**3. Hydrogen sulphide was lighted in a gas jar of enriched air with oxygen using the arrangement shown below:**

Hydrogen sulphide

**(i) Write an equation for the combustion of hydrogen sulphide. (1mk)**

 **…………………………………………………………………………………………………**

 **(ii) State what is observed if the product is passed through acidified potassium dichromate (1mk)**

 **…………………………………………………………………………………………………**

**4. When excess dilute hydrochloric acid was added to sodium sulphite, 960cm3 of sulphur**

**(IV) Oxide was produced. Determine the mass of sodium sulphite that was used in the reaction.**

**(*Molar gas volume = 24.0dm3, Na=23, S=32, O=16*) (3mks)**

**5. You are provided Lead (II) Oxide, dilute nitric acid, Sodium Carbonate and distilled water.**

**Describe briefly how you can prepare Lead (II) Carbonate from these reagents (3mks)**

 **…………………………………………………………………………………………………**

 **…………………………………………………………………………………………………**

 **…………………………………………………………………………………………………**

 **…………………………………………………………………………………………………**

 **…………………………………………………………………………………………………**

**6. Study the flow chart below and answer the questions that follow:**

Solid **X**

Heat

Brown gas **Y**

Yellow solid

Colourless solution

Dilute HNO3

White precipitate

Dilute hydrochloric acid

**(i) Name I.. Solid X …………………………………………………………..…………. (1mk)**

 **II. Brown gas Y ……………………………………………………………… (1mk)**

**(ii) What anion is present in solid X?............................................................................... (1mk)**

 **(iii) Write a chemical equation for the reaction that leads to the formation of brown gas and**

 **the yellow solid (1mk)**

 **…………………………………………………………………………………………………**

 **(iv) identify the white precipitate in the above flow chart. (1mk)**

**7. How many electrons are lost when 3.6g of Magnesium are converted to magnesium ions?**

 **(Mg = 24, L = 6.02 x 1023) (3mks)**

 **…………………………………………………………………………………………………**

 **…………………………………………………………………………………………………**

**8. Moist/damp/wet blue and red litmus papers were put in a gas jar containing air/oxygen. Burning sulphur was then lowered into the gas jar. State and explain the observation made. ………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………. .(2mks)**

**9. Iron filings were put in a test tube containing powdered sulphur then heated on a Bunsen flame. Stop heating when reaction starts. State and explain the observations made. (2mks) ………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….**

**10.Dry litmus papers and wet/damp/moist litmus papers were put in a gas jar containing sulphur(IV) oxide gas. State and explain the observations made (2mks).**

**..…………………………………………………………………………………………………………..……………………………………………………………………………………………………………………………………………………………………………………….**

**11. Study the chart below and answer the questions that follows:**

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 **a) Identify:-**

 **i) The cation in the solution K (1mk)**

 **ii) The white precipitate “L” (1mk)**

 **b) What property of white precipitate L is illustrated in steps I and II. (1mk)**

 **c) write an equation for the reaction of the white precipitate L and dilute HCl (1mk)**

1. **A,B,C are three homologous series of organic compounds**

|  |  |
| --- | --- |
| **Series**  | **General formula** |
| **A** | **CnH2n-2** |
| **B** | **CnH2n** |
| **C** | **CnH2n + 2** |

**(i) What is the name given to series C ( 1 mk)**

**(ii) Write down the name and structural formula of the second member of series “B” (2mks)**

**(iii) Write down an equation and name of the products of reaction between HBr with second member of series “B” ( 2 mks)**

**(iv) state a chemical test thaty can be used to distinquish a member of A and B. (2mks)**

1. **The diagram below illustrates how sulphur is extracted by frasch process**

**(a) (i) Label the pipe through which superheated water is pumped in ( 1 mk)**

 **(ii) What is the purpose of hot compressed air in this process? (1mk)**

**(b) The equation below shows the oxidation of sulphur (IV) oxide to sulphur (VI) oxide in the contact process**

**2SO2 (g) + O2 (g) →2 SO3(g) ∆H = - 196KJ**

**(i) Name the catalyst used in this process ( 1 mk)**

**14. (a) The diagram below shows some processes that takes place during the industrial manufacture of sulphuric acid.**

**(i) Write the equation for the reaction in which sulphur (IV) Oxide is produced (1mk)**

**(ii) Why is it necessary to keep the gas pure and dry? ( 1 mk)**

**(iii) Describe the process that takes place in chamber G ( 1 mk)**

**(iv) Name the gases that escape into the environment ( 1 mk)**

**(v) State and explain the harmful effect on the environment of one of the gases (1mk)**

**(vi) state two uses of sulphuric(vi) acid. (1mk)**