**FORM THREE CHEMISTRY PAPER 2**

**NAME: ………………………...……………..ADM NO: …………CLASS: …….……**

1.The grid below shows part of the periodic table. Use it to answer question that follow. The letters do not represent actual symbols.

 S U V

 P R T W

 Q

1. Which of the elements has the highest atomic radius? Explain (2marks)
2. Identify the most reactive non- metal. Explain (2marks)
3. Give the electron configuration of: (1mark)

(i)Element **S**

 (ii)Element **Q**

1. Compare the atomic radius of P and R. Explain (2marks)
2. Given that the atomic mass of W is 40. Write down the composition of its nucleus. (1mark)
3. Write the formula of compounds formed between:

(i) Element **P** and **S** (1mark)

(ii)Element R and T (1mark)

1. Give the formula of one stable ion with an electron arrangement of 2.8 which is:

(i)Negatively charged (1mark)

(ii)Positively charged (1mark)

2.The diagram below shows the process of manufacturing sodium carbonate using ammonia soda

process. Study it and answer the questions that follow.



 (a) Name gases **A** and **B**. (2 marks)

 **A**

 **B**

 (b) Name liquid **C** and solid **D**. (2 marks)

 **C**

 **D**

 (c) Write equations of the reactions in: (2 marks)

 **Tower P**

 **Tower R**

(d) Name the product **T** formed at chamber **R** and give one of its uses. (2 marks)

3. Air was passed through several reagents as shown in the flow chart below.

 **Gas p**

**Concentrated**

**Sodium hydroxide**

**Electrostatic**

**Excess heated**

**Copper turnings**

**Excess heated**

**Magnesium**

**Compressor**

**Fractionating column**

**Nitrogen**

**(-1960C)**

**Argon**

**(-1860C)**

**C (-1830C)**

**Air**

 (a) Name the major components of air. (2mks)

(b) Write an equation for the reaction which takes place in the chamber with:

(i) Concentrated sodium hydroxide. (1mk )

(ii) Excess heated **copper turnings.** (lmk)

(iii) Excess heated **magnesium powder**. (1mk)

 (c) Name **onegas** which escapes from the chamber containing magnesium powder. Give a reason for your answer. (2mks)

(d) Name the substance that was eliminated by electrostatic precipitation. (l mk)

(e) Name a reagent that can be used in place of concentrated sodium hydroxide. (1 mk)

f) Name substance **C**. (l mk)

(g) State three uses of **gas C**. (3 mks)

4. a. (i) Sulphur is allotropic. What does this mean? (1 mk)

 (ii) Give two differences between rhombic and monoclinic sulphur. (2 mks)

(iii) State and explain using an equation the observations made when sulphur reacts with hot concentrated nitric (v) acid. (3 mks)

 Observations

 Equation



I. (i) Name the raw materials A and B. (2 mks)

A

B

 (ii) Name the chambers X and Y. (2 mks)

II. (i) Name two impurities that are removed during the purification stage.(2 mks)

(ii) Why must the impurities in (i) above be removed. (1 mk)

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

 (ii) The equation below shows what happens in the catalytic chamber.

2SO2(g) + O2(g )  2SO3  ∆ H = -197KJ/Mol

 (iii) State the two conditions that are necessary for maximum production of SO3 (1 mark)

5. A student set up the apparatus as shown in the diagram below to prepare and collect

 dry ammonia gas.



**Heat**

**Drying agent**

**Mixture of Ammonium chloride and Calcium hydroxide moist**

i. Identify **two** mistakes in the set up and give a reason for each mistake (3mks)

ii. Name a suitable drying agent for ammonia (1mk)

iii. Write an equation for the reaction that occurred when a mixture of ammonium chloride and calcium hydroxide was heated. (1mk)

iv. Describe one chemical test for ammonia gas. (2mks)

b) Ammonia gas is used in the manufacture of nitric (v) acid, as shown below.

High

temperature

Cooling chamber

Absorption tower

Ammonia

Air

 Gases

A

B

Water

Unit III

Unit II

Unit I

i. This process requires the use of a catalyst. In which unit is the catalyst used? (1mk)

ii. Identify compound **A** and **B**

**A** (1mk)

 **B** (1mk)

iii. Ammonia and nitric (v) acid are used in the manufacture of ammonium nitrate fertilizer. Calculate the amount of nitric (v) acid required to manufacture 1000kg ammonium nitrate using excess ammonia (3mks)

6.A mixture of magnesium powder and lead (II) Oxide will react vigorously when heated but no reaction occurs when a mixture of magnesium oxide and lead powder areheated.

a) Explain the observation above. (2mks)

b) Write an equation for the reaction between magnesium and lead (II) oxide. (1mk)

c) From (b) above, identify:

 i. Oxidized substance (1mk)

 ii. Oxidizing agen(1mk)

iii. What name is given to such a reaction (1mk)

d) The following data gives the pH values of solution A, B and C, use the information provided to answer the questions that follow.

|  |  |
| --- | --- |
| Solution | pH |
| A | 13.9 |
| B | 6.7 |
| C | 1.5 |

i. Which solution would give pink colour after adding a few drops of phenophthalein? Give its possible identity (2 marks)

Solution

Identity

ii. Which solution would produce carbon (IV) oxide when reacted withcopper (II) carbonate?( 1 mark)

iii. Which solution would produce ammonia gas when reacted with ammonium chloride?(1 mark)

7.a) What name is given to a compound that contains carbon and hydrogen only? (1 mark)

b) Hexane is a compound containing carbon and hydrogen.

1. What method is used to obtain hexane from crude oil? (1 mark)
2. State **one** use of hexane. (1 mark)

c) Study the flow chart below and answer the questions that follow.



Ca(OH)2

Step 3

Step 1

Step 2

L + H2O

1 mole HCl

K

Gas J

 Step 4

1 mole H2

Step 6

H2O catalyst

C2H4

CH3CH3

CH3CH2OH

Ni,H2,150oC

Step 5

1. Identify reagent L.

 (1 mark)

1. Name the catalyst used in step 5. (1 mark)

1. Draw the structural formula of gas J. (1 mark)
2. State;
3. **One** use of product R. (1 mark)
4. A commercial application of the process which takes place in step 6. (1 mark)