**JOINT EXAMINATION**

 **CHEMISTRY MARRKING SCHEME**

 **PAPER 2**

 **TERM 3 – 2023**

**1.a.** Name the family into which element P belongs to

 **Inert or noble gases**

 **b.** Which two elements forms the most soluble carbonates

 **k and w**

**c.** With a reason, identify elements in period 3 with the largest atomic radius

 **Q. atomic radius decreases across the period due to increase in number of protons**

**d.** Write the formula of the compound formed between Q and M

  **Q5M2**

**e.** State two uses of element R and for each use , state property of element R that makes lts possible for the use

 **Use**

 Used to make overhead power transmission cables

 **Property**

 Its ductile

 **Use**

 Used to make parts of aircrafts

 **Property**

Its light and malleable

 f. compound formed between R and oxygen



g. In terms of structure and bonding explain why the oxides of element T has relatively low boiling points

 **T forms an oxide which has a simple molecular structure. Its molecules are held by weak van der Waals forces that require little energy to break hence the low boiling point.**

2. (a) name the following compounds

 **i. Butanoic acid**

 **ii. 2,5- diBromo, 4-Methyl Pent -1,3- diene**

 **iii Ethylpropanote**

 **b** (i) Identify each type of the detergent

 **p- soapy detergent**

 **Q- soapless deterge**  (ii)Which of the two detergents is the best to use with hard water? Give a reason

 **Q(soapless) the corresponding salts of calcium and magnesium are soluble hence no scum is formed**

 (iii) State one advantage of detergent P

 **Are cheap and biodegradable**

 (iv) State one disadvantage of detergent Q

 **Are expensive and nonbiodegradable**

C I Identify the hydrocarbon

 **Ethene**

(ii) Name two reagents that can reacted together to generate the hydrocarbon

 **Concentrated sulphuric vi acid and ethanol**

3.(a)Name two apparatuses that can be used for determining mass in a laboratory

 **Beam balance**

 **Electronic balance**

(b) One of the flames produced by Bunsen burner is the luminous flame i) Explain why this flame is very bright **it consists mainly of unburnt tiny particles of hot glowing carbon which give out the light**

ii) State two disadvantages of the luminous flame

* **It’s less hot compared to nonluminous**
* **Produces soot**

C. Air is usually one of the substances that is considered as a mixture

 (i) Identify the two most abundant component of air

 **Nitrogen and oxygen gases**

(ii) Give two reasons why the air is considered as a mixture

* **Its components can be separated by physical means i.e. by fractional distillation**
* **Its components are not in fixed proportions**
* **It properties are a sum of the properties of the components**

Iii . One of the components of air is carbon (iv) oxide. Describe an experiment that can be used to prove the presence of carbon (iv) oxide in the air **Bubble the air in calcium hydroxide solution (lime water) a white precipitate is formed**.

4(a) i) Name the above process used to obtain sulphur from the underground deposits

**The Frasch process**

 (ii) Name the substance passed through pipe

 **A - hot compressed air at 15atmospheres**

 **B-molten sulphur and water**

iii) State two properties of Sulphur that makes it possible to extract using the above process **-it has a relatively low density -has a low melting point**

b. I) Identify the following:

 Substance Q formed in the burner - **Sulphur IV oxide gas**

 Chamber T- **catalytic chamber** Substance R - **concentrated sulphuric VI acid** Substance S **water**

ii) Write the chemical equation occurring in the dilution chamber

 H2S2O7 (l) + H2O (l) 2H2SO4 (L)

iii) Why is it necessary to pass substance Q though a purifier

**to remove impurities that may poison the catalyst and affect the efficiency of the process**

iv) State one use of sulphuric (VI) acid

- **manufacture fertilisers - manufacture detergents, dyes and paints,plastics -as an electrolyte in lead acid accumulators**

5. (a) (i) *Name* solid *Q*.

 **Anhydrous calcium chloride**

 (ii) *What is* the purpose of NaOH(aq)?

**To absorb carbon IV oxide gas**

 (iii) *Write* an equation for the reaction which took place in tube *P*.

 Cu (s) + O2 (g) CuO ( S)

(iv) *Give the name* of one impurity in the nitrogen gas obtained

 **Argon gas**

Iv) Why *is* liquid nitrogen used for storage of semen for artificial insemination

 **It is an inert liquid at a very low temperature which prevents the destruction of the specimen**

 I. *Give* the name of liquid *R*

**Concentrated sulphuric iv acid**

 II. *Write an equation* for the reaction which took place in the retort flask.



III. ***Explain*** why: -

(a) Nitric acid is not stored in clear/transparent glass.

**Its highly volatile, it decomposes in the presence of sunlight to nitrogen IV oxide water and oxygen**

 (b) The reaction between copper metal with 50% nitric acid *(one volume of acid added to an equal volume of water)* in an open test tube produces brown fumes

**copper reacts with acid to form nitrogen II oxide; nitrogen II oxide is then oxidised by atmospheric oxygen in nitrogen IV oxide which is brown fumes**

6 i) State the condition necessary in step 1  **heat**

ii) Identify: Reagent M- **any soluble carbonate, (sodium/ potassium)** gas S **- oxygen gas** product T **- Nitric III acid V - nitric V acid**

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7. (a) Name substances **A**, **B**, **C** and **D**. (4mks)

**A- ammonical brine**

**B – sodium hydrogen carbonate**

**C – ammonium chloride**

**D- calcium chloride**

 (b) Write equation for the reactions taking place in chamber 2, 3 and 5



(c) Name the physical process in chamber 4 and 5.

 **Chamber 4 – filtration**

 **Chamber 5 -heating**

(d) Name **one** source of carbon (IV) oxide for Solvay process.

 **Heating lime stone or calcium carbonate**.

(f) give 2 uses of sodium carbonate

**- making of glass - in paper industry softening hard water - making sodium silicate that is used in making detergents**