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

**CHEMISTRY PAPER 2**

**END OF TERM 1 EXAM 2022**

**FORM THREE**

**INSTRUCTIONS.**

**Answer all the questions in the spaces provided.**

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

|  |  |  |
| --- | --- | --- |
|  |  | T  |
|  | K  |  |  |  |  | U  |  |  |
| X  | Y  |  | M  |  |  | Q  | W  |  |
| J  |  |  |  |  |  |  |  | Z  |

1. How is the atomic radius of element X and Y compared? (2mks)
2. Using crosses (x) to represent electrons, draw the atomic structure of element Q. (1mk)

State the period and the group to which element Q belong. (2mks)

1. The ionic configuration of element G is 2.8 G forms an ion of the type G-1. Indicate in the grid the position of element G. (1mk)

ii. To which chemical family does element G belong? (1mk)

iii. State one use of element U. (1mk)

iv. Write the equation that would take place when Y is heated with air. (2mks)

1. A student left some crushed fruit mixture which fermented to form water and ethanol with boiling point of 100OC and 78OC respectively. The set up of the apparatus below were used to separate the mixture.

 B

thermometer Apparatus W

j

 A

 Conical flask

 mixture

;

1. Name the apparatus labeled W. (1mk)
2. What is the purpose of the thermometer in the set-up? (1mk)
3. At what end of the apparatus W would tap water connected? (1mk)
4. Which liquid was collected first as a distillable? Explain (2mks)
5. i. What is the name given to above method of separating mixture? (1mk)

ii. State two application of the above method of separating mixtures. (2mks)

1. What properties of the mixture make it possible to be separated by the above method? (1mk)
2. a. State one use of graphite. (1mk)

ii. Both graphite and diamond are allotrope of element carbon. Graphite conduct electricity whereas diamond does not. Explain. (2mks)

b. Below is a simplified scheme of solvery process. Study it and answer the questions that follow.

Brine

Ammonia

Process 1

Process II

Process

 Gas R Sodium Carbonate

i. Identify gas R. (1mk)

ii. Write an equation for the process III. (1mk)

iii. Name the process II. (1mk)

1. Give two uses of sodium carbonate. (2mks)
2. The diagram below shows a charcoal stove with different region.

 C

 B

 A

1. Write an equation for the formation of product B. (1mk)
2. How would one prevent the production of product at B? (2mks)
3. An unknown mass X, of an hydrous potassium carbonate was dissolve in water and the solution made up to 200cm3. 25cm3 of this solution required 18cm3 of 0.22M nitric acid for complete neutralization. (K=39,C=12,O=16)
4. Write an equation for the reaction that took place (2mks)
5. Calculate the number of moles of nitric (V) acid that reacted with anhydrous potassium carbonate. (2mks)
6. Calculate the number of moles of anhydrous potassium carbonate that was neutralized by acid. (2mks)
7. Determine the value of X. (2mks)

5 a. Describe the process by which oxygen can be obtain from air. (4mks)

1. The flow chart below shows industrial manufacture of nitric (V) acid.

 X y

Purifier

Catalytic chamber

Heat exchanger

Absorption tower

 Y

 Nitric acid

1. Identify substance X and Y. (2mks)
2. Write an equation for the reaction taking place in the absorption tower. (2mks)
3. The concentration of acid obtain is 60%. How can this concentration be increased to about 65%. (1mk)

ii. A factory uses nitric (V) acid and ammonia as the only reaction for the production of a fertilizer. If a mass of 9600kg of fertilizer was produced. Calculate the mass of ammonia gas needed. (N=14, H=1, O=16) (3mks)

1. Sulphur is extracted from underground deposits by process in which three concentric pipes are sink down to the deposit as shown.

 J

 L

 K

1. Name the process represented above. (1mk)
2. What is passed down through pipe J? (1mk)
3. Name two allotropes of sulphur. (2mks)

b. Commercial sulphuric acid has a density of 1.8gcm-3.

i. Determine the molarity of the acid. (3mks)

ii. Determine the volume of commercial acid in a above that can be used to prepare 500cm3 of 0.2MH2SO4 solution. (3mks)

iii. Oleum is an intermediate product in the industrial manufacture of sulphuric acid. How is oleum (H2S2O7) converted into sulphuric acid. (1mk)

1. Give two use of sulphuric (VI) acid. (2mks)
2. Two reagent that can be used to prepare chlorine gas are manganese(IV) oxide and conc. Hydrochloric acid.
3. Write an equation for the reaction. (2mks)

ii. Give the formula of another reagent that can be reacted with conc. Hydrochloric acid to produce chlorine gas. (1mk)

1. Describe how chlorine gas could be dried and collected in the laboratory. (2mks)
2. In an experiment, dry chlorine gas was reacted with aluminium as shown in the diagram below.

 Calcium chloride

 Dry chlorine gas A

 Aluminium

1. Name substance A (1mk)
2. Write an equation for the reaction that took place in the combustion tube. (2mks)
3. State the function of calcium chloride. (1mk)
4. Give the properties of substance A. (1mk)

ii. Name other three substances that behavior as A. (3mks)

1. In an experiment, chlorine was passed into moist hydrogen sulphide in a boiling tube as shown below.

 chlorine gas

 boiling tube

 moist hydrogen sulphide

1. What observation was made in the boiling tube? (1mk)
2. Write an equation for the reaction that took place in the boiling tube. (2mks)