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

**CHEMISTRY PAPER 1**

**END OF TERM 1 EXAM -2022**

**FORM THREE**

**TIME:**

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

1. (a) Give the main allotrope of sulphur. (2mks)

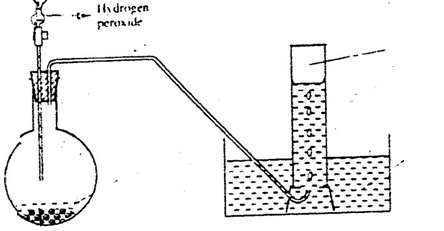
(b) Define transition temperature. (1mk)

1. (a) Define crystallization. (1mk)
2. A student added some pure potassium nitrate crystals to cold water and stirred the mixture. A few of the crystals did not dissolve at room temperature.
3. Give a reason why some crystals did not dissolve. (1mk)
4. What would happen if the contents of the mixture in a beaker were warmed? Explain. (2mks)
5. Name two substance that can be reacted to give copper (II) sulphate. (1mk)
6. Ammonia gas was passed into water as shown below.

Water

NH3(g)

1. When a red litmus paper was dropped into the resulting solution, it turned blue. Give a reason for this observation. (1mk)
2. What is the function of the funnel? (1mk)
3. The diagram below is set-up for the laboratory preparation of oxygen gas.



Oxygen gas

Water

Solid R

Stand

X

1. Name solid R. (1mk)
2. Name the apparatus X. (1mk)
3. Write an equation for the reaction that takes place in the flask. (2mks)
4. An element Y has electronic arrangement of 2.8.5.
5. State the period and the group which the element belong. (2mks)
6. Write the formula of the most stable ion formed when the element Y ionizes. (1mk)
7. Lithium has two isotopes with mass number 6 and 7. If the R.A.M (relative atomic mass) of Lithium is 6.94, determine the percentage abundance of such isotope. (3mks)
8. Give the name of each of the following processes described below when salts are exposed to air for some time.
9. Anhydrous copper (II) sulphate becomes blue.
10. Magnesium chloride forms an aqueous solution.
11. Fresh crystals of sodium carbonate Na2CO3.10H2O covered with a white powder of formula Na2CO3H2O.
12. A hydrated salt has the following composition by mass;

Iron 20.2%, oxygen 23.0%, sulphur 11.5%, water 45.3%. Its relative formula is 278. (Fe=56, S=32, O=16)

1. Determine the formula of hydrated salt. (3mks)
2. When magnesium is burnt in air it reacts with oxygen and nitrogen gas giving a white ash. Write two equations for the two reactions that take place. (3mks)
3. The set-up was used to collect gas F, produced by the reaction between water and calcium metal.

Beaker

Gas F

Water

Calcium metal

Test tube

1. Name gas F. (1mk)
2. At the end of the experiment, the solution in the beaker is a weak base. Explain. (2mks)
3. Give the laboratory use of solution of solution formed in the beaker. (1mk)
4. The grid below sow part of the periodic table. The letters are not the actual symbol of the element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | | | | | |  |
|  |  |  |  | G |  |  | K |  |
|  |  |  | H |  |  | I |  |
| F |  |  |  |  |  |  |  |  |

1. Select;
2. Element which has the largest atomic radius. (1mk)
3. Most reactive non-metal. (1mk)
4. Show on the grid the position of element ‘J’ which forms J-2 ions with electronic configuration of 2.8.8.8. (1mk)
5. Write the equation between element F and I. (2mks)
6. Use dots (.) and crosses (x) to represents electrons. Draw diagram to show bonding in
7. (i) NH+4 (1mk)

(ii) H3O+  (1mk)

(iii) CO2 (1mk)

1. In terms of structure and bonding, explain why graphite is used as a lubricant. (2mks)
2. The following diagram, show the structure of two allotropes of carbon. Study them and answer the questions that follow.

Allotrope M

Allotrope N

1. Name the allotropes. (2mks)

M - ……………………………..

N - ……………………………..

1. Give one use N. (1mk)
2. Use the scheme below to answer the questions that follow.

Solid H

*Heat*

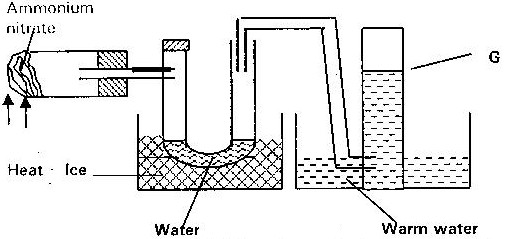
Carbon (IV) oxide

Solid J

Ca(OH)2(aq)

*H2O*

1. Identify the solids J and H. (2mks)
2. State one commercial use of solid H. (1mk)
3. Ammonium nitrate was gently heated and the products collected as shown in the diagram below.



Describe one chemical test and physical properties that can be used to identify gas G. (3mks)

1. Form two student in an attempt to prevent rusting, put copper and zinc in contact with iron as shown below.

Iron

Iron

Zinc

Copper

X

Y

State what would happen in the set up X and Y. (2mks)

1. Explain how you would separate a mixture of ammonium chloride and sodium chloride into its pure components. (2mks)
2. Calculate the mass of lead (II) nitrate that must be heated to give 22.3g of lead (II) oxide. (pb = 207, N=14, O=16) (3mks)
3. 0.84g of aluminium reacted completely with chlorine gas. Calculate the volume of gas used. (Molar gas volume is 24dm3, Al=27) (3mks)
4. State Gay Lussac’s Law. (1mk)
5. In an experiment 20cm3 of sulphur (IV) oxide are found to react completely with 10cm3 of oxygen to produce 20cm3 of sulphur (VI) oxide. Determine the equation for the reaction. (3mks)
6. Define absolute temperature. (1mk)
7. At 27oC and 740mmHg pressure, a sample of nitrogen gas occupies 30cm3, what will be its volume at standard temperature and pressure (s.t.p) (3mks)
8. Complete the following equation and balance. (3mks)

Heat

NH4NO2

Heat

KNO3

Pb(NO3)

1. The molecular formula of gas R is 28 and its empirical formula is CH2. (C=12, H=1)

Determine the molecular formula of gas R. (2mks)

1. (a) Define the terms:
2. Electrolyte - (1mk)
3. Electrolysis - (1mk)

(b) Explain the difference in conductivity between magnesium and molten magnesium chloride. (1mk)

1. 30cm3 of hydrogen gas were reacted with 40cm3 of oxygen according to the equation.

2H2(g) + O2(g)  2H2O(g)

Identify the gas that was in excess and by how much volume? (2mks)