**FORM TWO CHEMISTRY**

**MID TERM 3 2022**

**MARKING SCHEME**

**NAME ……………………………………………………………….ADM……………CLASS…………**

1.Name the elements that are present in the following compounds .

i)Sodium nitrate (1 ½ mks)

*sodium, nitrogen and oxygen*

ii)Aluminium Oxide (1mk)

*alluminium and oxygen*

iii)Zinc sulphate

*zinc, sulphur, oxygen*

2.Fractional distillation of liquid air is usually used to separate various gaseous mixtures In air. Explain how to;

a)Remove carborn (IV) oxide (1mk)

*by passing it through concentrated sodium hydroxide/potassium hydroxide*

b)Remove water (1mk)

*cooling to a temperature of -250C*

c)Obtain nitrogen (2mks)

*cool to -200oC and carry out fractional distillation to obtain nitrogen*

3.Distinguish between ionization energy and

a)Electron affinity of an element (2mks)

*ionization energy is the minimum amount of energy required to remove an electron from the outer most energy level of an atom in gaseous state*

b)The grid below represents part of the periodic table. Study it and answer the questions that follow.

|  |  |  |
| --- | --- | --- |
|   |  |  |
| A |  |  |  | B |  | C |  |
|  | D | E |  | F | G |  |
| H |  |  |  |  |  |  |  |  |

i)Select the most active metal (Explain. (2mks)

*H- it easily looses electrons because it has a large atomic radius*

ii)Select an element that can form an ion with a charge of -3 (1mk) ***B***

iii)Select an alkaline earth metal (1mk) ***D***

iv)Which group I element has the highest first ionization energy? Explain (2mks)

1. *Has a small atomic radius hence its outer electron is held strongly*

v)Element A combines with chlorine to form a chloride of A. State the most likely PH value of solution of a chloride A. Explain. (2mks)

*PH 7. The compound ionizes in water to form neutral solution*

4.Explain the meaning of the following terms:-

i)Deliquescence – *the process by which substances absorb water from the atmosphere to form solutions when exposed*

ii)Saturated solution- *a solution that cannot dissolve any more solute at a given temperature*

b)Study the flow chart below and answer the questions that follow. (5mks)

Brown gas B colourless gas C

White solid A

White ppt E

Yellow solid D when cold

Colourless solution

i)Identify:-

***A****:- lead nitrate*

***B****:-nitogen (IV) oxide*

***C****:-Oxygen gas*

***D****:-lead (II) oxide*

***E****:Lead (II) chloride*

ii)Describe test for colourless gas (1mk)

*when a glowing splint is lowered into a gas into a gas jar of C, it relights*

iii)Write a balanced equation for the formation of B,C and D from solid A (2mks)

*2Pb(NO3)2(s) heat 2PbO(s) + O2(g) + 4NO2(g)*

5a)Molten magnesium chloride conducts electricity while solid magnesium chloride does not. Explain (2mks) -*In solid magnesium chloride the ions are in a fixed position hence not mobile while in a molten magnesium chloride, the ions are mobile hence conducts electricity*

Using dots (.) and crosses (x), show bonding in

i)Ammomium ion (NH4+) (2mks)



ii)Carbon (II) oxide (2mks)



5.The diagram below shows set-up which was used to investigate the effect of the electricity on molten lead (II) iodide.

a)Explain what happens to the lead iodide during the electrolysis (3mks)

*leads ion migrate towards the cathode where they are reduced to lead metal while iodide ions migrate towards the anode where it is oxidized to iodine vapour*

b)Write equations to show the reaction taking place:-

i)At the cathode (1mk)

*Pb2+(l) + 2e- Pb(s)*

ii)At the anode (1mk)

2I-(l) I2(g) +*2e-*

c)Why was it important to carry out the experiment in a fume chamber?

*Iodine vapour is poisonous*

6. *Brine filtration*

 Solid V

 *Carbon (IV) oxide* *Liquid x*

Reaction chember

*Heating limestone*

 Ca(OH)2 Sodium carbonate

*Reaction chamber 3*

 Calcium chloride

a)i)Name the three starting materials in the manufacture of sodium carbonate (3mks)

*Brine Ammonia Limestone*

ii)Which substances are recycled in this process (3mks)

*Ammonia Water Carbon (IV) oxide*

iii)Identify the chambers in which recycled substances are regenerated. (3mks)

reaction chamber 3- Ammonia

reaction chamber 2 – Carbon (IV) oxide / water

iv)Name the substance V and X (2mks)

*V- sodium hydrogen carbonate*

*X- Ammonium chloride*

b)Give an equation for the reaction which occurs:-

i)In reaction chamber 1 (1mk)

*Nacl(aq) + NH3(g) + CO2(g) + H2O (l) NH4cl (aq) + NaHCO3 (s)*

ii)When solid V is heated (1mk)

*2NaHCO3(s) heat Na2CO3(s) + H2O(l) +CO2 (g)*

iii)In the reaction chamber 3 (1mk)

2NH4CL (aq) + Ca(OH)2(aq) 2NH3(g) + Cacl2 (s) + 2H2O(l)

iv)State one commercial use for sodium carbonate (1mk)

*-water softening*

*-Glass making*

*-paper industry*

*-Making sodium silicate*

7.a)State two differences between luminous and non-luminous flame (2mks)

*Luminous*

*Produce soot*

*Large and weavy*

*Has four zones*

*Non- luminous*

*Doesn’t produce soot*

*Small and steady*

*Has three zones*

b)Explain how the hotness of a Bunsen burner flame can be increased (1mk)

*by keeping the air hole open fully*

8.List three differences between temporary physical

a)changes and temporary chemical changes (3mks)

*temporary physical*

*no change in mass*

*no new substance formed*

*not accompanied by net*

*heat change*

*temporary chemical*

*there is change in mass*

*new substance formed*

*heat energy evolved or absorbed*

b)A mixture contains ammonium chloride, copper (II) oxide and sodium chloride. Describe how each of the substances can be obtained from the mixture (3mk)

*heat the mixture , ammonium chloride sublimes and is collected as a sublimate*

*add water into the remaining mixture, stir then filter to obtain copper (II) oxide as the residue and sodium chloride solution as the filtrate; heat the filtrate to saturation to obtain crystals of sodium chloride*

9.The PH of a sample of soil was found to be 5.0

a)An agricultural officer recommended the addition of calcium oxide in the soil. State two functions of Calcium Oxide in the soil. (2mks)

*to raise soil PH*

*to add nutrients to the plants*

b)Dilute Sulphuric acid was added to a compound of magnesium P. the solid reacted with the acid to form a colorless solution; Q and a colorless gas R which formed a white precipitate when bubbled through lime water.

a)Name:-

i)Compound P (1mk) *magnesium carbonate*

ii)Solution Q (1mk) *magnesium sulphate solution*

iii)Colorless gas R (1mk) *Carbon (IV) Oxide gas*

b)Write a chemical equation for the reaction that took place (2mks)

*MgCO3(s) + H2SO4(aq) MgSO4(aq) + CO2(g)*

c)State the observations that would be made if a similar compound of calcium was used instead of magnesium. Explain (2mks)

*the reaction will stop after sometime due to production of insoluble calcium sulphate that coats the carbonate preventing further reactions*

10.State two advantages and two disadvantages of:- (4mks)

a)Rusting

*Advantages*

*-adds iron to the soil*

*-it reduces environmental pollution*

*Disadvantages*

*Destroys machinery, equipment*

*Destroys roofs made of iron*

b) The setup below was used to prepare oxygen in the lab

hydrogen peroxide



 **oxygen gas**

**solid R**

**Water**

i)Name solid R (1mk)

*Manganese (IV) Oxide*

ii)Write an equation for the reaction that took place in the flask (2mks)

*2H2O2(l) MnO2 2H2O(l) + 2O2(g)*

iii)Give two commercial uses of oxygen gas (2mks)

c)2K(s) + 2nO(s) K2O(s) + Zn (s) (2mks)

Name the reducing and oxiding agents.

*Reducing agent – potassium*

*Oxidizing agent – Zinc (II) Oxide*

11a)State two chemical tests for presence of water (2mks)

*-it turns white unhydrous Copper (II) Sulphate blue*

*-Turn blue unhydrous Cobalt (II)Chloride paper pink*

b)State what is observed when a small piece of potassium is placed in water. Write a word equation for the reaction (4mks)

*-it moves about on the surface of water*

*-it melts into a silvery ball*

*-there is effervescence*

*Potassium + Water potassium hydroxide + hydrogen gas*

c)Describe how hydrogen gas is dried in the lab (2mks)

*-by passing the wet hydrogen through concentrated sulphuric acid or through unhydrous calcium chloride packed in a u - tube*

12.The diagram below shows the relationship between physical states of matter. Use it to answer the questions that follows.

gas

liquid

solid

Identify the process (4mks)

*R: melting*

*V: evaporation*

*W: condensation.*

*U:freezing*

b)Name two substances which undergo the process represented by S and T (2mks)

*-Carbon (IV) Oxide*

*-Benzoic acid*

*-Iron (III) Chloride*

*-Ammonium chloride*

*-Aluminium chloride*

13.The diagram below represent two iron nails with some parts covered tightly with Zinc and copper respectively. What observations would be made at the exposed points R and Z if the wrapped nails are left in the open for several days. Explain (4mks)

 R Z

 Zinc coated part copper coated part

*At R no rusting occurred. Zinc is more reactive than iron hence it reacts with moist air instead of iron*

*At Z rusting occurred. Copper is less reactive than iron hence iron react with moist air to form rust*