

NAME:.....ADM:.....CLASS:.....

TEACHER.CO.KE
CHEMISTRY
FORM 3
OPENER EXAM TERM 1, 2022

TIME:
MARKS: 70 marks

- State the types of change that take place in each of the following situations.
 - Burning a piece of charcoal
Chemical change
 - Heating copper (ii) carbonate strongly. (1mk)
Chemical change
 - Heating Zinc (II) Oxide strongly. (1mk)
Physical change
- Name another gas which is used with Oxygen in welding.
Acetylene/ Hydrogen/Ethyne
- The diagram below is a set – up for the Laboratory preparation of Oxygen gas.
 - Name solid P. (1mk)
MnO₂
 - Write an equation for the reaction that takes place in the conical flask. (2mks)

$$2\text{H}_2\text{O}_2 \xrightarrow{\text{MnO}_2} 2\text{H}_2\text{O(l)} + \text{O}_2 \text{(g)}$$
 - Give two commercial uses of Oxygen.
 - **Used in hospital for breathing difficulties**
 - **Used by mountain climbers and sea divers.**
- State two reasons why hydrogen is not commonly used as fuel. (2mks)
 - **Not easily available**
 - **Expensive**
 - **A mixture of H₂ and our explodes when ignited.**
- The figure shows a set – up by a form three student to prepare a certain gas.
 - Write an equation for the formation of gas K. (2mks)

$$\text{Ca(s)} + 2\text{H}_2\text{O(l)} \longrightarrow \text{Ca(OH)}_2\text{(aq)} + \text{H}_2\text{(g)}$$
 - Give one use of gas K in the industries. (1mk)
Used in large scale production of ammonia during Habler process.
 - Give one use of the resulting solution after the metal has reacted. (1mk)
 - **Used in good processing**
 - **Sewage treatment**
 - **In paper production.**
- Outline the differences between luminous and non-luminous kinds of the flames.
 - **Luminous flame is long and wavy while non-luminous is short and straight.**
 - **Luminous has four zones while non-luminous has 3 zones.**

7. (a) What are acid-base indicators? (1mk)

A substance that gives a definite colour in acidic and different definite colour in basic

- (b) Outline the advantages of the universal indicator over the other acid – base indicators. (2mks)

- **Universal indicators shows strengths of acids or bases while others doesn't**

- **Universal indicators can be kept for long/future use unlike flower extract.**

8. (a) State Charles law? (1mk)

At a constant pressure, the volume of a fixed mass of a gas is directly proportional to its absolute temperature.

(b) Explain why motor vehicle tyres should not be inflated hard during the dry season if the vehicle is to be driven over a long distance during the day. (2mks)

The fixed mass of a gas is heated due to friction thus the air will increase in volume.

(c) A gas occupies 450cm^3 at 27°C . What volume would the gas occupy at 177°C ; if pressure remains constant.

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$V_2 = \frac{V_1 T_2}{T_1}$$

$$\frac{450 \times 450}{300}$$

$$V_2 = 675\text{cm}^3$$

9. Convert the temperature below to the absolute scale.

- (i) 0°C (1mk)

$$0 + 273 = 273\text{K}$$

- (ii) 50°C (1mk)

$$50 + 273 = 323\text{K}$$

- (iii) -30°C (1mk)

$$-30^\circ\text{C} + 273 = 243\text{K}$$

10. State boyle's law of gases? (1mk)

The volume a fixed mass of a gas is inversely proportional to it's pressure at constant temperature.

11. Describe how a solid sample of lead (II) Sulphate would be prepared using the following reagents. (3mks)

- Na_2SO_4

- Nitric (V) acid

- Solid lead (II) Carbonate

- **Excel lead (II) Carbonate in dilute nitric acid until effervescence stops.**

- **Filter out the unreacted lead (II) Carbonate**

- **To the filtrate add Na_2SO_4 to precipitate out lead (II) sulphate.**

- **Filter the mixture to obtain residue**

- **Wash with distilled water and dry between the filter paper**

12. In the manufacture of Sodium Carbonate by Solvay process, ammoniated brine trickles down the carbonator while carbon (VI) oxide rise up the same tower.

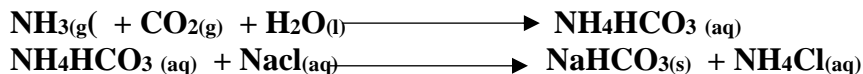
- (a) What is ammoniated brine? (1mk)

It is the sodium Chloride saturated with Ammonia.

- (b) What is the main source of carbon (IV) Oxide in the above process? (1mk)

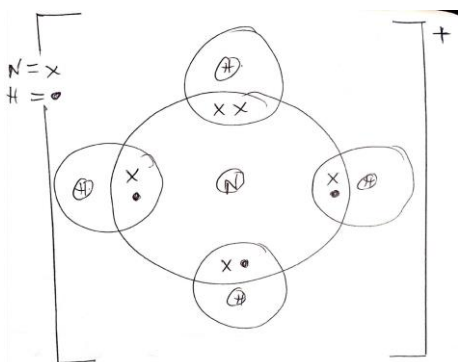
Heating limestone/calcium carbonate. (CaCO_3)

- (c) Write two equation for the reactions in the Carbonator (2mks)

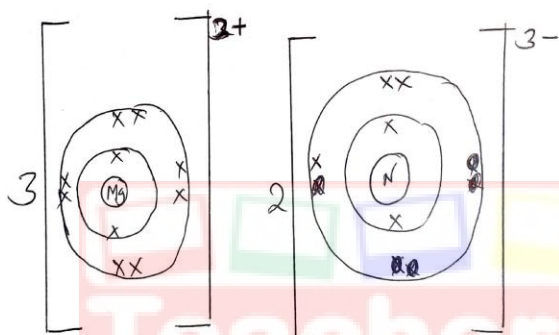


13. Using dots (.) and Cross (x) to represent electrons draw diagram to represent. (2mks)

(i) NH_4^+ (2mks)



(ii) MgN_2 (2mks)



14. The grid below shows part of the periodic table, use it to answer the questions follow. The letters do not represent actual symbol of elements.

(a) Identify the families name to which element shown below. Belongs.

(i) P and Q. (1mk)

Alkali metal

(ii) R (1mk)

Alkaline earth metal

(iii) U (1mk)

Halogen

(b) (i) Which element is highly reactive metal? Explain (2mks)

The outermost election is loosely held to the nucleus.

(ii) Select the element which is highly reactive non-metal. Explain (2mks)

U

- **It has high electron affinity compared to Z and**

(c) Which of the elements has the highest atomic radius? Explain (2mks)

Q- it has 4 energy levels.

- (d) Give electron configuration of
- (i) Element S (1mk)
2.6
- (ii) Element Q (1mk)
2.8.8.1
- (e) Compare the atomic radius of P and R. Explain. (2mks)
- **P has larger atomic radius than R.**
 - **R has many protons than P leading to an increase in nuclear charge thus increasing the force of attraction that holding the outer most electrons of R strongly to the nucleus thus decreasing the atomic radii.**
- (f) Write down the formula of the compounds formed between (2mks)
- (i) Element P and S
P₂S
- (ii) Element R and T
RT

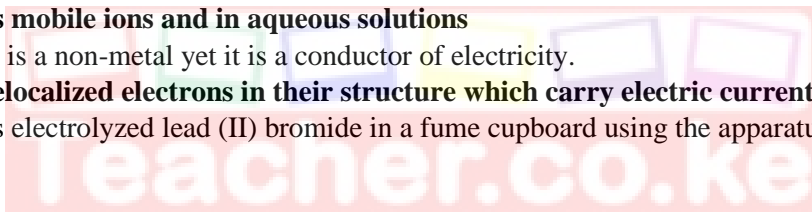
15. Name the type of bonding and structure found in.

- (a) Ice (2mks)
Bond- weak van der weals forces
Structure – Simple muscular structure
- (b) Magnesium Chloride. (2mks)
Bonding – **Ionic**
Structure – **giant ionic structure**

16. Explain the following observations.

- (i) NaCl allow electric current to pass through it in a molten state. (1mk)
NaCl has mobile ions and in aqueous solutions
- (ii) Graphite is a non-metal yet it is a conductor of electricity. (1mk)
It has delocalized electrons in their structure which carry electric current.

17. a form 2 students electrolyzed lead (II) bromide in a fume cupboard using the apparatus shown below.



- (a) Why is heat needed for this electrolysis? (2mks)
- **To change lead (II) bromide into molten state so that ions become free and mobile**
- (b) Suggest the name of a substance that could be used for the electrodes. (1mk)
Platinum or graphite
- (c) State the name of the products of electrolysis at (2mks)
- (i) **The anode – Bromine vapour (brown)**
- (ii) **The cathode- lead (grey)**
18. Element A, B, C and D are not actual symbols, have atomic number 19, 9, 12 and 10 respectively. (1mk)
- (a) Which two elements represent non- metals
B and D

- (b) Write down the formula of the compound formed between elements B and C and identify the bond present in the compound . (2mks)

CB₂

Is an ionic bond

