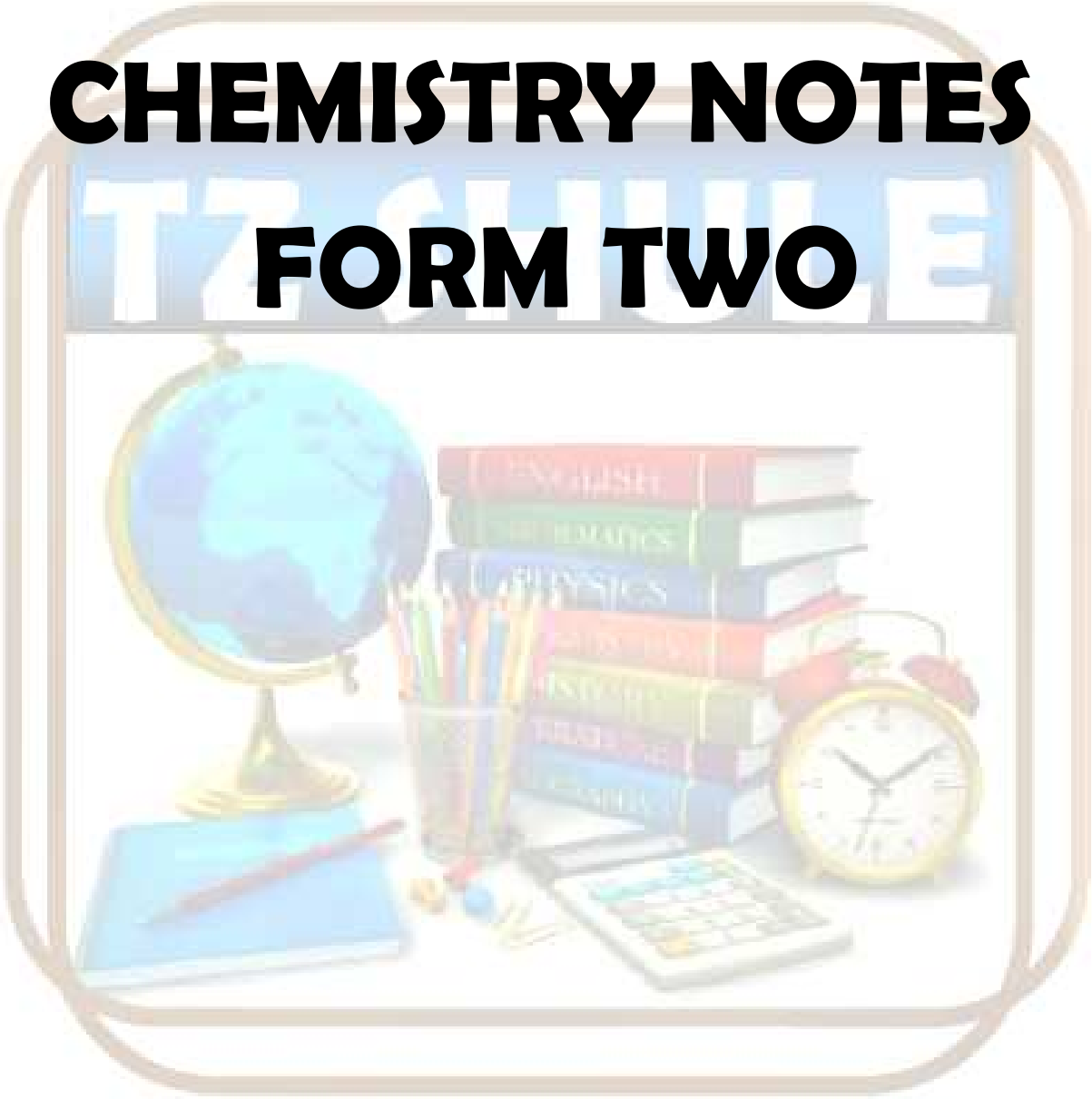
CHEMISTRY NOTES
FORM TWO



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OXYGEN

PREPARATION AND PROPERTIES OF OXYGEN.

Oxygen ,Is a gas that forms about 21% by volume of the air.

Laboratory Preparations of Oxygen

Oxygen can be manufactured by **decomposition of hydrogen peroxide**.

Decomposition of hydrogen Peroxide

Hydrogen Peroxide decomposition leads to production of oxygen gas and Water.

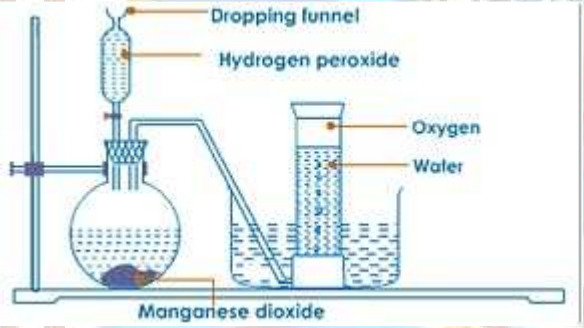
Equation;

Hydrogen peroxide → water + oxygen

$$2H_2O_2 \rightarrow H_2O_{(l)} + O_{2(g)}$$

Method of collection

Oxygen is collected by **downward displacement of water** because it is slightly soluble in water.



Physical Properties of Oxygen

1. Oxygen is colourless, tasteless and odorless.
2. It is slightly dissolves in cold water.
3. It is denser than air.
4. It boils at -183^0c.

5. It freezes at -218^0c.

Chemical Properties of Oxygen

1. Its supports burning.
2. It is an oxidizing agent.
3. It reacts with metals to form basic oxides.
4. It reacts with non- Metal to form acidic oxides.

Chemical test for oxygen

A glowing wooden splint lowered into a gas jar of oxygen,the wood will be relighted.

Uses of Oxygen

Respiration: All living organisms need oxygen, through the process of aerobic respiration, energy from food is generated by the help of oxygen.

1. **Manufacturing**: In industry, oxygen is used in cutting, welding and melting of metals since it capable of generating flame of high temperature which is known as oxy-hydrogen flame.
2. **Transport**: Oxygen is used as an oxidizer for rocket fuel.
3. **Healthcare**: Oxygen supplies are kept in stock. These are provided to patients who have difficulties in breathing.

REVIEW QUESTION

1. (a) Describe the preparation and properties of oxygen.

   (b) Give the uses of oxygen.

HYDROGEN

Is lightest and the most abandonment element in the universe.

This means it is an element from which the sun and stars are made from.

LABORATORY PREPARATION OF HYDROGEN

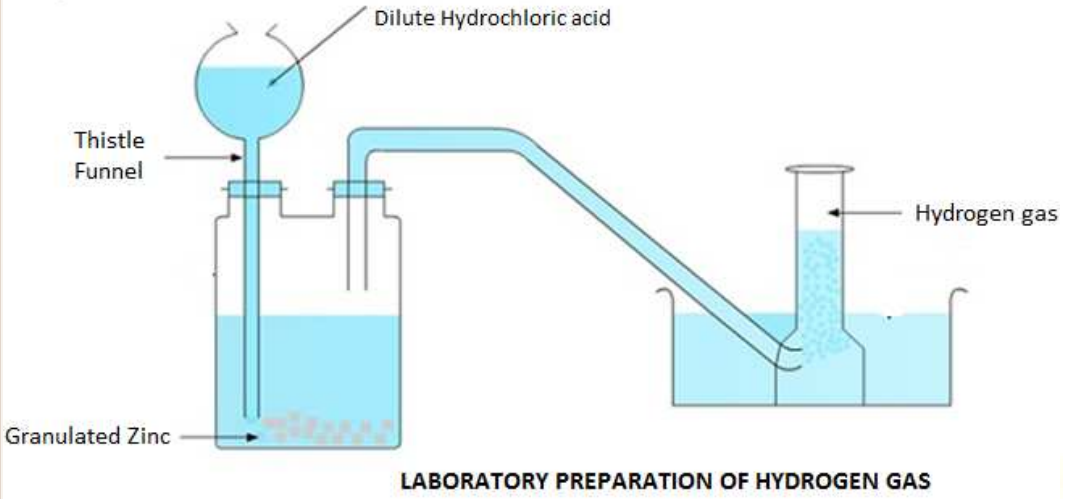
Hydrogen can prepared in the laboratory by the following method;

The reaction of dilute hydrochloric acid and with zinc metal. When a zinc reacts with diluted Hydrochloric acid, zinc chloride and Hydrogen gas is produced.

Reaction: $Zn_{(s)} + 2HCl_{(l)} \rightarrow ZnCl_{2(aq)} + H_{2(g)}$

- Zinc +Hydrochloric acid → Zinc chloride + hydrogen gas

Hydrogen is a good **reducing agent.**



LABORATORY PREPARATION OF HYDROGEN GAS

Reducing agent - Is substance which removes Oxygen from substance. E.g: metal oxides.

Reduction: Is the removal of oxygen from substance.

Or

Reduction: Is the addition of hydrogen to a substance.

Reaction:

Copper (ii) oxide + hydrogen ⟶ copper + water

$CuO_{(s)} + H_2(g) \longrightarrow Cu_{(s)} + H_2O_{(l)}$

Oxidation: Is the removal of hydrogen from a substance.

Or

Oxidation: Is the addition of Oxygen to a substance.

Industrial Manufacturing of Hydrogen

In industry the hydrogen gas manufactured by **Electrolysis**

Electrolysis of Water

Is a process in which an element decompose.

Reaction: Water → Oxygen + Hydrogen

$$2H_2O_{(l)} \rightarrow O_{2(g)} + 2H_{2(g)}$$

Physical Properties of Hydrogen

1. It‘s tasteless, colourless and odorless.
2. It's lighter than air, Therefore it is in the atmosphere.
3. It‘s only slightly soluble in water.
4. It‘s does not support combustion.

Chemical properties of Hydrogen

1. It combine easily with other chemicals substance at high temperature.
2. It does not usually react with other element at room temperature.
3. It is highly flammable and burns with a blue of flame.
4. It reacts slowly with oxygen to produce water.
5. It is neither acidic nor basic.

Uses of Hydrogen

1. **Manufacture of ammonia**: Hydrogen is used in the synthesis ammonia by reacting it with nitrogen in the presence of an iron. This is done on large scale through the laboratory process.
2. **Manufacture of Margarine** : Hydrogen is used in the Manufacture of margarine.
3. **Oxy-hydrogen flame**: Hydrogen is used to produce oxy-hydrogen flame. This flame can be used for welding and cutting metal.

4. **Fuel** : Since hydrogen is highly flammable, especially when mixed with pure oxygen, it is used as a fuel in rockets. Usually they combine liquid hydrogen with liquid oxygen to make an explosive mixture.

REVIEW QUESTION

1 (a) By the acid of diagram explain preparation of hydrogen using zinc and dilute hydrochloric acid.

(b) Give the properties and uses of hydrogen.

WATER

WATER

Water is a very important compound which is essential for the substance of all living things.

Occurrence of Water

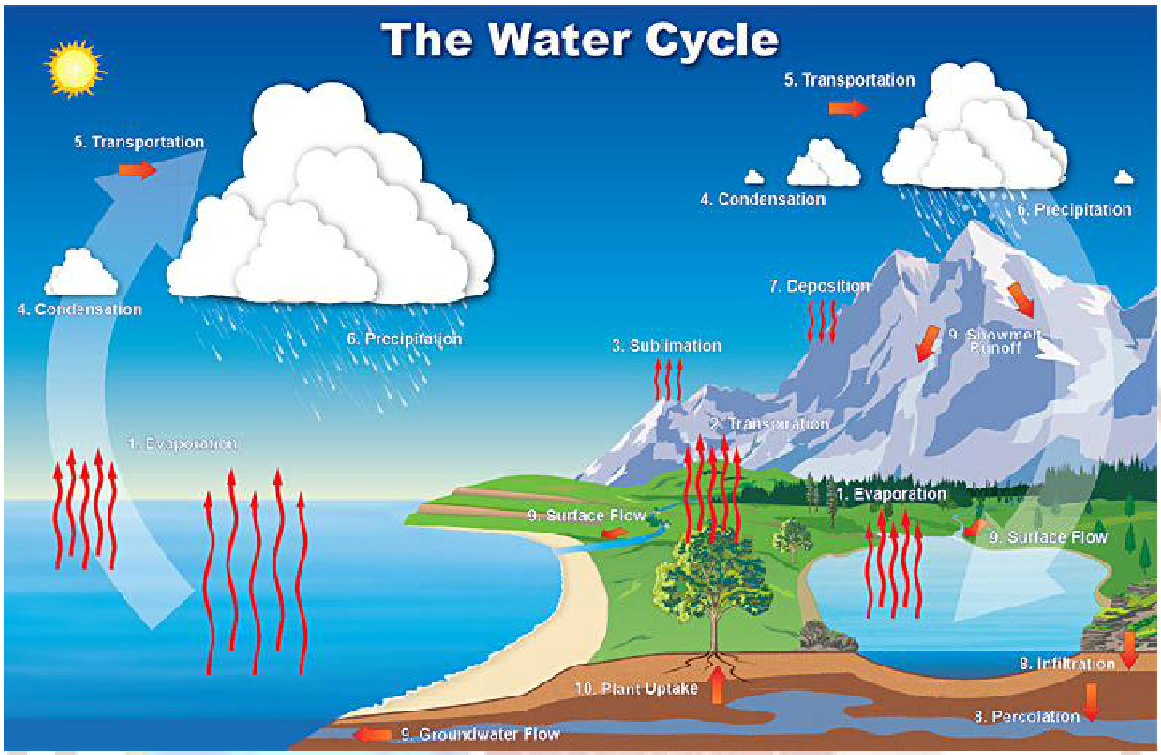
The water on the earth occurs in **three main states;**

1. S*olid*
example*:* Ice, snow, hail.

2. *Liquid*
example: dew, rain.

3.*Vapor*
example: mist, steam, clouds.

- About **97%** of all the water on the Earth is salty water while only **13%** is fresh water.



A cycle is a number of change which come back to the starting point. Water is never lost but it is continuously recycled around the globe in a system called **water cycle**.

The water cycle is made up of 4 main stages:

1. Evaporation
2. Condensation
3. Precipitation
4. Collection

Physical properties of water

1. It is colorless, odorless and tasteless.
2. It is only substance that occurs naturally in all the three states of matter.
3. Pure water freezes at 0cºand boils at 100ºc.
4. It is universal solvent because it can dissolve more substance than any other liquid.
5. It has a high specific heat index because it can absorb a lot of heat before it begins to get hot.
6. It is miscible with many liquid for example ethanol.

Chemical properties of Water

1. Pure water is neutral , it is neither acidic nor basic.

2. Cold water reacts with some metals such as potassium, sodium and calcium to form metallic hydroxide and hydroxide and hydrogen gas.

Example:

Word equation

Cold water + Potassium → Potassium hydroxide + Hydrogen

$2H_2O_{(l)} + 2K_{(s)} \rightarrow 2KOH_{(s)} + H_{2\mathbf{(g)}}$

Calcium + Cold water → Calcium hydroxide + Hydrogen

$Ca_{\mathbf{(s)}} + 2H_2O_{\mathbf{(l)}} \rightarrow Ca(OH)_{2(s)} + H_{\mathbf{2(g)}}$

3. Steam (water vapor) reacts with some metals such as zinc , Timonium and iron to produce metallic oxide and hydrogen gas.

Iron + Water vapor → Iron(iii)oxide + Hydrogen

$2Fe_{(s)} + 3H_2O_{(g)} \rightarrow Fe_2O_{\mathbf{3(s)}} + H_{2(g)}$

Zinc + Water vapor → Zinc oxide + hydrogen

$Zn_{(s)} + H_2O_{(g)} \rightarrow ZnO_{\mathbf{(s)}} + H_{2(g)}$

WATER TREATMENT AND WATER PURIFICATION

Water treatment: Is the process of making water usable for industrial, medical and other purposes.

The aim is to remove existing contaminants in the water

Treatment process may be physical such as settling, chemical eg.disinfection or biological

Water purification

Is the removal of contaminants from treated water to produce drinking water, pure enough for human consumption. Substances that are removed include bacteria, algae, fungi, minerals and human made chemical pollutants.

Domestic water purification

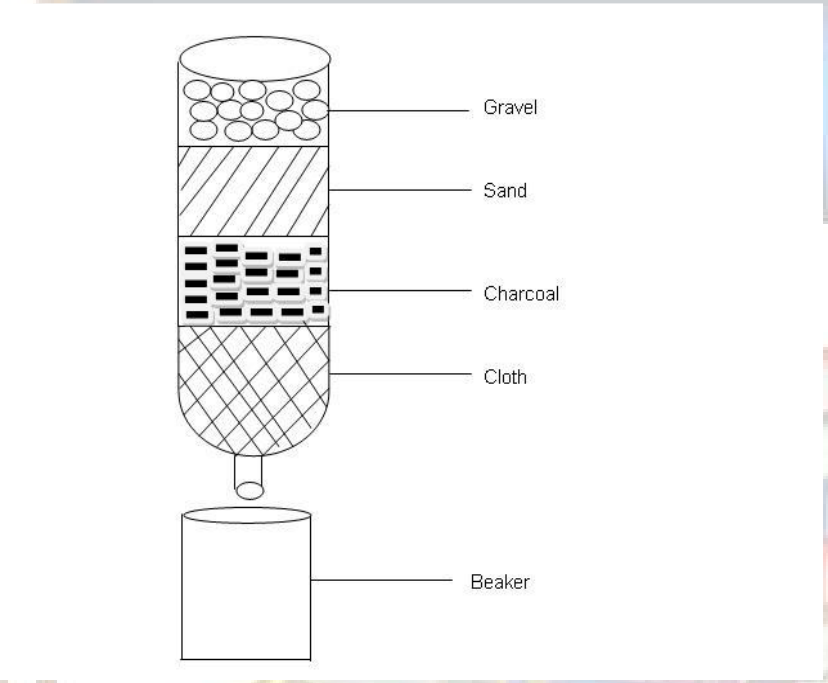
The common method used at homes in purifying water

1. Boiling

2. Commercial filters and
3. Use of purifiers

1. Boiling: During the method the water is heated and left for sometimes before heating is stopped. This method helps to kill disease – causing organism. The boiled water is then allowed to cool before being used.

2.Commercial filter: Use 80%, This filters work by having the water pass through a charcoal element that purifies water the filtered water is much clear than the original muddy water.



Role of:

Gravel: To trap any floating substances.

Sand: To trap large particles.

Charcoal: To kill some of harmful bacteria.

Clean cloth: To filter the very tiny particles.

3.Uses of purifiers: Chemical purifiers are usually in liquid form. Are commended amount of purifiers is put in a specific of water in a container. The water is shake (stirred) wool then left to set line for at least (20minutes) before it can be sate for drinking. **Example of Purifiers area** Aqua guard, water guard.

TEST FOR WATER

The presence or absence of water can be established by two methods (regrets);

1. Copper (ii) sulphate solution
2. Cobalt chloride paper

1.Copper (ii) sulphate

White anhydrous **copper (ii) sulphate** turns **blue** on addition of **water**.The reason is the formation of a new substance **anhydrous copper (ii) sulphate**.

2.Cobalt chloride

Blue cobalt chloride paper changes into **pink** when react with **water**.

NB: Cobalt chloride test is most common substances than liquid (solution).

URBAN WATER TREATMENT

The water various services before reaching their destiny is substance to see major stages namely;

1. Screening
2. Reservoir
3. Primary filtration
4. Secondary filtration
5. Disinfection/ chlorination
6. Storage

1. Screening:

Is the stage once water is drawn from its sources, the floating substances are removed.

2. Reservoir

The stage in which water is stored high up, so as it flows through gravitation.

3. Primary filtration

Is a process in which large particles are removed, when they are filtered through courses of sand.

Aluminum sulphate is added to remove smaller particle how?

This is because Aluminum sulphate causes the impurities to chump together and sink to the bottom of contain process is called **Coagulation**.

4. Secondary filtration

Is a process in which water is passing through finer sand and thus causes removal of smallest particles.

5. Disinfection / chlorination:

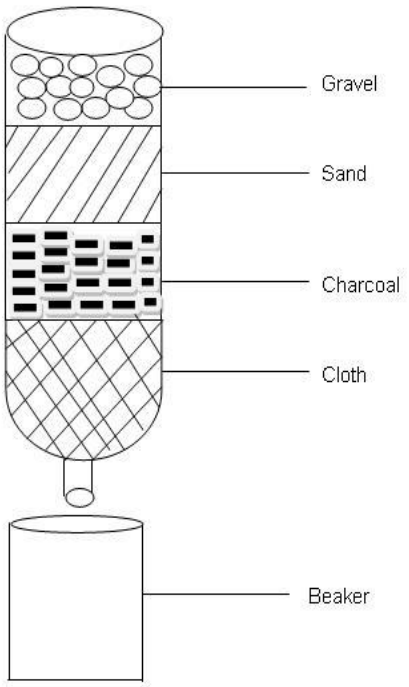
Is a process in which chlorine added in a moderate amount to kill harmful bacteria.

6. Storage

This is the final stage where by water is pure and safe enough to be stored for use

Exercise

1. The diagram below represent a simple water filter.



(a) Name the parts labelled A to D.

A- Cloth

B-Charcoal

C- Sand

D- Gravel

(b) **What is the importance of each part?**

Gravel- To trap any floating substance.

Sand- Is are removed large particles.

Charcoal- Is to kill some of harmful bacteria.

Cloth- To filter the very tiny particles.

(c). **What would be the disadvantages of using such as filter to obtain drinking water?**
- The disadvantage is that It can cause disease.

IMPORTANCE OF WATER TREATMENT

Reason why water has to be treated:

1. Water that has not been treated may contain harmful and other parasites that causes diarrhea , typhoid, cholera other illness.
2. Treated water is the best for using in laboratories to ensure accurate result from experiments.
3. Treated water is suitable for using in factories to ensure the actual products are Safe for consumption.
4. Treated water is more efficient to use for cleaning in industries and domestic setting.

Conclusion: Untreated water lead to usage of amount of certain substance such as soap for cleaning.

ATOMIC STRUCTURE

ATOM: Is the smallest particle of an element that can take part in a chemical reaction.

Atoms as the smallest particles have ability to exist on its own. Dalton was the first person to use the word ATOM.

DALTON ATOMIC THEORY

1. All matter are made up of tiny particles called **ATOM**.
2. Atoms can neither be created nor destroyed.
3. Atoms of a given element are identical. They have the same atomic mass and similar chemical properties.
4. Atoms of one elements can combine with atoms of other elements to form **molecules**.
5. Atoms of given element are different from those of other elements.

MODIFICATION OF DALTON ATOMIC THEORY

1. Atoms are made up of smaller particles called **electrons**, **protons** and **neutrons**.

2. Atom can be created or destroyed or split up by **nuclear reaction/ nuclear fission**.

3. Some element have atom of more than one type. They are called **Isotopes**.

4. Atoms of different elements combine together to form **complex compound**.

SUB ATOMIC PARTICLES

- **Atom are made up of 3 particles these are;**

  - PROTON

  - ELECTRON

  - NEUTRON

- All atoms of an element have both 3 particles except hydrogen which has **no Neutron**.

A: **THE ELECTRON**

- This is a negatively charged particle (**-ve**)
- It's mass is about;

$$\frac{1}{1840}$$

- It's symbol is '**e**'
- It rotates around the nucleus in a particular patten called **shell** or **energy level**

B: **THE PROTON**

- This is a positively charged particles (**+ve**)

- It has mass approximately the same as that of hydrogen atom ie atomic mass
- It is symbol is (**p**) or $+_1^1\mathbf{P}$
- It is found in the nucleus of an atom

C**: THE NEUTRON**

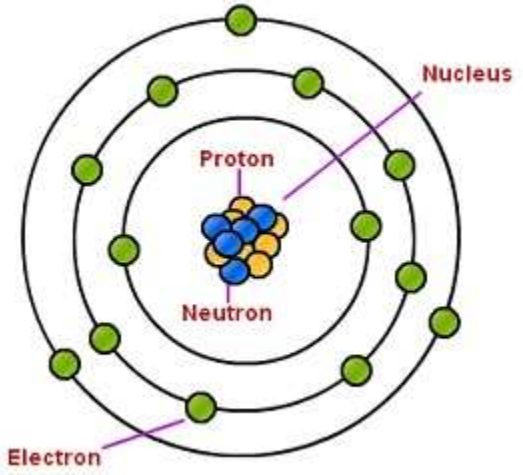
- This is a **neutral** particle or is a particle which has .**no charge**
- The mass is the same as that of protons ie atomic mass unit
- It symbol is (**n**)

$_0^1n$

- It is found in the nucleus of an atom
- summary

Sub atomic particle	symbols	location	charge	Relative mass (RAM)
Proton	P	In the nucleus	+1	1 amu
Electron	e-	Outside the nucleus	-1	1/1840 amu
Neutron	n	In the nucleus	0	1 amu

- ATOMIC STRUCTURE



Although an atom contain charge particles (protons) and electron is natural because the number of protons (+Ve) are equal to the number of electron (-Ve)

THE ARRANGEMENT OF ELECTRONS IN ATOM

ELECTRONIC CONFIGURATIONS

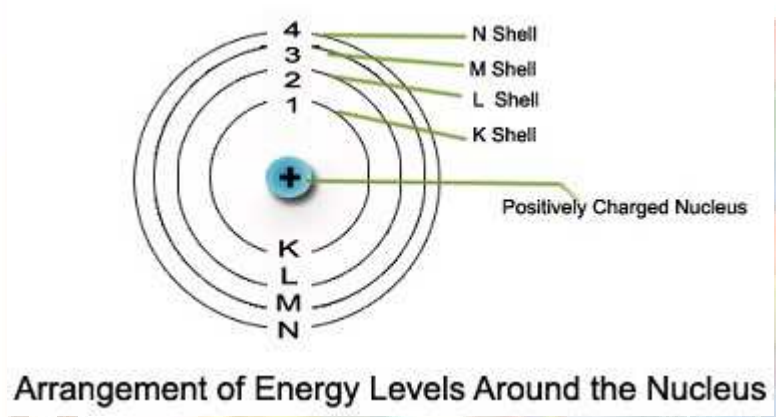
Electronic configuration: Is the distribution of electrons in various shell of an atom.

The maximum number of electrons held within each energy level. It can be determined by the formula $2n^2$

Where n is the position of energy level from the nucleus

- The first shell from the nucleus of an atom have ability of carrying only 2 electron. $\Rightarrow(2\times1^2) = 2$ electrons
- The second shell from the nucleus of an atom has ability of carrying only 8 electrons. $\Rightarrow(2\times2^2) = 8$ electrons
- The third shell from the nucleus of an atom have ability of carrying only 8 electronic. $\Rightarrow (2\times3^2) =18$ electrons
- The forth shell from the nucleus carry a maximum of 18 electrons. $\Rightarrow (2\times4^2) = 32$ electrons

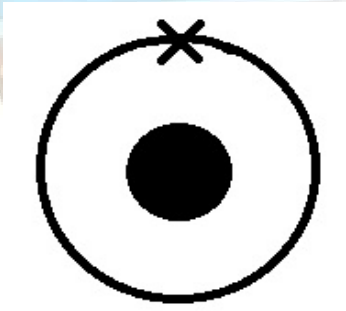
NOTE; But the third energy level is stable with 8 electrons



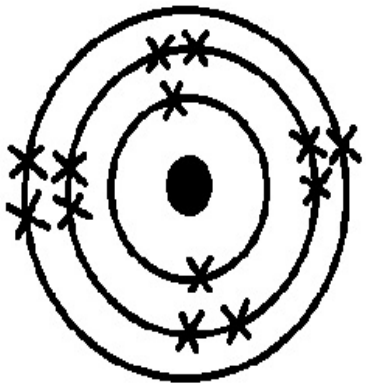
Arrangement of Energy Levels Around the Nucleus

Example of electron diagrams of an atom;

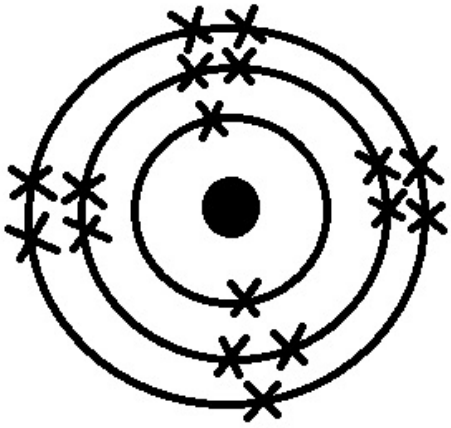
1. ***Hydrogen, 1=1***



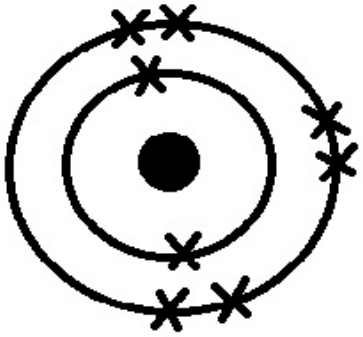
2. Aluminium, 13=2:8:3



3. Chlorine, 17 =2:8:7



4. Oxygen, 8= 2:6



ELECTRONS CONFIGURATIONS OF FIRST ELEMENT

Element	Symbol	Number of neutron	Atomic number/Proton and Electron	Atomic Mass	Electronic configuration (KLMN)	Number of shell
Hydrogen	**H**	**0**	**1**	**1**	**1**	**1**
Helium	**He**	**2**	**2**	**4**	**2**	**1**
Lithium	**Li**	**4**	**3**	**7**	**2:1**	**2**
Beryllium	**Be**	**5**	**4**	**9**	**2:2**	**2**
Boron	**B**	**6**	**5**	**11**	**2:3**	**2**
Carbon	**C**	**6**	**6**	**12**	**2:4**	**2**
Nitrogen	**N**	**7**	**7**	**14**	**2:5**	**2**
Oxygen	**O**	**8**	**8**	**16**	**2:6**	**2**
Florine	**F**	**10**	**9**	**19**	**2:7**	**2**
Neon	**Ne**	**10**	**10**	**20**	**2:8**	**2**
Sodium	**Na**	**12**	**11**	**23**	**2:8:1**	**3**
Magnesium	**Mg**	**12**	**12**	**24**	**2:8:2**	**3**
Aluminum	**Al**	**14**	**13**	**27**	**2:8:3**	**3**
Silicon	**Si**	**14**	**14**	**28**	**2:8:4**	**3**
Phosphorus	**P**	**16**	**15**	**31**	**2:8:5**	**3**
Sulphur	**S**	**16**	**16**	**32**	**2:8:6**	**3**
Chlorine	**Cl**	**18**	**17**	**35**	**2:8:7**	**3**
Argon	**Ar**	**18**	**18**	**36**	**2:8:8**	**3**
Potassium	**K**	**19**	**19**	**38**	**2:8:8:1**	**4**
Calcium	**Ca**	**20**	**20**	**40**	**2:8:8:2**	**4**

NOTE

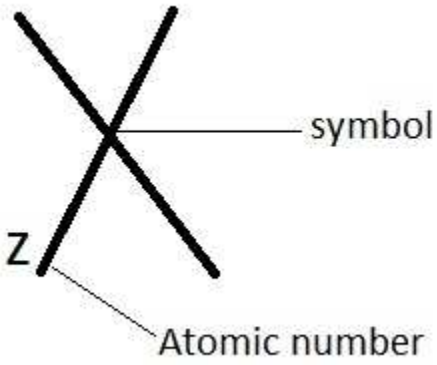
1. In the above the element are arranged according to the increase in atomic number
2. The number of proton = number of electron = Atomic number
3. The **mass number (A)** is the sum of **proton (P)** and **neutron (N):** (**A = P+N**)

ATOMIC NUMBER, MASS NUMBER AND ISOTOPES

ATOMIC NUMBER (Z)

Is the number of proton in the nucleus of an atom which is equal to the number of electron in the shell.

- It's official symbol is (Z).
- Atomic number is written on left hand side below the symbol of an element.

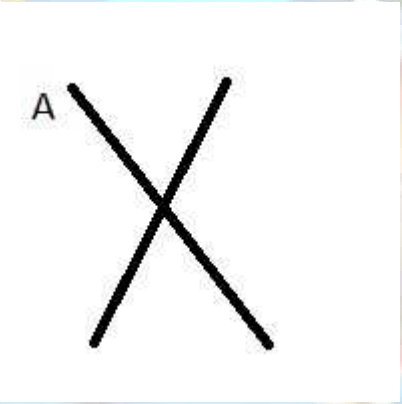


- Therefore atomic number of the following element are written as $_{6}C$, $_{8}O$, $_{17}Cl$, $_{20}Ca$
- Also atomic number = number of proton = number of electron

2. **MASS NUMBER / ATOMIC MASS (A)**

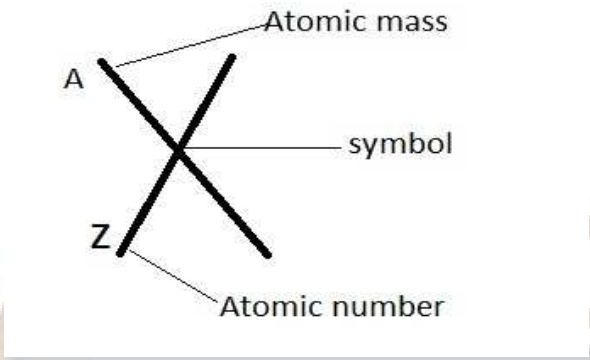
- It is written on left hand side above the symbol of an element.

E.g;



.E.g. Carbon atomic mass is 12 written as ^{12}C chlorine atomic mass is written as ^{35}Cl

- The official symbol for mass number is A.
- Combination of mass and atomic number are;



e.g.

Carbon $^{12}_{6}C$

Chlorine $^{35}_{17}Cl$

Oxygen $^{16}_{8}O$

Therefore Atomic mass = Proton (atomic number)
Example; Atom R has mass number of 40 and an atomic number of 20. What is it's neutron number , and what is the number of electrons in an atom R ?

Solution ; mass number = 40
atomic number = 20

(a) Neutron number = mass number − atomic number

= 40 − 20
∴ Neutron number = 20

(b) Number of electrons = number of protons = atomic number = 20

ISOTOPES

These are atoms of the same element which have the same atomic number but they differ in mass number.

- Isotopes have the same proton electron and atomic number.
- They have same chemical properties but have slight different physical properties.
- Isotopes has different mass number because they have different number of neutrons.
- **Example of element which have the isotopes;**

a) carbon $^{12}_{6}C$ $^{13}_{6}C$ $^{14}_{6}C$

b) chlorine $^{35}_{17}CL$ $^{37}_{17}CL$

c) oxygen $^{16}_{8}O$ $^{17}_{8}O$ $^{18}_{8}O$

d) hydrogen $^{1}_{1}H$ $^{2}_{1}H$ $^{3}_{1}H$

NOTE:

- in the above four examples, the numbers above the element in the isotopes are the mass numbers.
- The numbers below the element are atomic numbers.
- From the definition of the isotopes, it is true that mass number are different and atomic number are the same.

RELATIVE ATOMIC MASS (RAM)

- The relative atomic mass of an element is the mass of an atom of carbon twelve(12) Isotopes .

$^{12}_{6}C$ has no units

- If an element has several Isotopes its relative atomic mass will be the mass of Isotopes on calculation. The average mass of the proportion (abundance) of each Isotope in the sample of element must be known.
- This is calculated by working out the relative abundance of each isotope

CALCULATING RELATIVE ATOMIC NUMBER

$$\text{Relative atomic mass (RAM)} = \frac{(\text{Relative abundance} \times \text{Atomic mass}) + (\text{Relative abundance} \times \text{Atomic mass})}{100}$$

Example:

1. A sample of chlorine gas contains 75% and 25% of the Isotopes with it's relative abundance of 35 and 25 respectively. What is the relative atomic mass (R.A.M) of chlorine?

$$\text{RAM} = \frac{(\text{Relative abundance} \times \text{Atomic mass}) + (\text{Relative abundance} \times \text{Atomic mass})}{100}$$

$^{35}_{17}CL$ of the Isotopes $^{37}_{17}CL$ and 25% of the Isotopes.

To get the answer multiply the mass number of each Isotopes with the abundance.

Solution

$$\left(\frac{75}{100} \times 35\right) + \left(\frac{25}{100} \times 37\right)$$

$$\frac{75 \times 35 + 25 \times 37}{100}$$

$$\frac{525}{20} + \frac{925}{100} = \frac{3550}{100}$$

R.A.M of chlorine = 35.5

- The relative atomic mass of chlorine is 35. 5. The word symbol of relative atomic mass is (RAM).

2. A sample of chlorine is a mixture of two Isotopes in the ratio of 3:1. What is the relative atomic mass of chlorine atom?

Solution

$$\left(\frac{3}{4} \times 35\right) + \left(\frac{1}{4} \times 37\right)$$

$$\frac{3 \times 35 + 1 \times 37}{4}$$

$$\frac{105 + 37}{4}$$

$$= \frac{142}{4}$$

R.A.M of chlorine = 35.5

3. A sample of Oxygen is mixture of 3 Isotopes in the ratio of 3:2:1. What is relative atomic mass (R.A.M).

Solution

$^{16}_{8}O$ $^{17}_{8}O$ $^{18}_{8}O$

3:2:1 = 3+2+1 = 6

$\left(\frac{3}{6} \times 16\right) + \left(\frac{2}{6} \times 17\right) + \left(\frac{1}{6} \times 18\right)$

$\frac{3\times16 + 2\times17 + 1\times18}{6}$

$\frac{48 + 34 + 18}{6}$

R.A.M of Oxygen = 16.6

REVIEW QUESTION

1. Define the following

(i) Atomic

(ii) Electronic configuration

(iii) Atomic number

(iv) Mass number

(V) Isotope

2. Calculate the relative atomic mass of the chlorine $^{35}_{17}Cl$ and $^{37}_{17}cl$ have the relative abundance of 75% and 25% respectively

3. Copy and complete the following table of atomic / electron structure of same element

(a).

Element	Atomic number	Relative atomic number	Number of proton	Number of neutron	Number of electron	Electron configuration
x	7	14				
y		23	11			

(b) Silver is an element which exists naturally and mixture of two isotopic form A and B representation of two isotopes occur in equal number.

A is $^{107}_{47}Ag$, B is $^{109}_{47}Ag$

In each case the upper figure is the mass number and the lower figure is the atomic number, state is the atomic number of

(a) Proton in atom A
(b) Electron in atomic B
(c) Neutrons in atomic A
(d) Electron in atomic B
(e) What is the relative atomic mass of naturally occurring silver?

4. Taking the symbol $^{16}_{8}x$ to represent an atom of the element x_1, state

(a) The atomic number of x

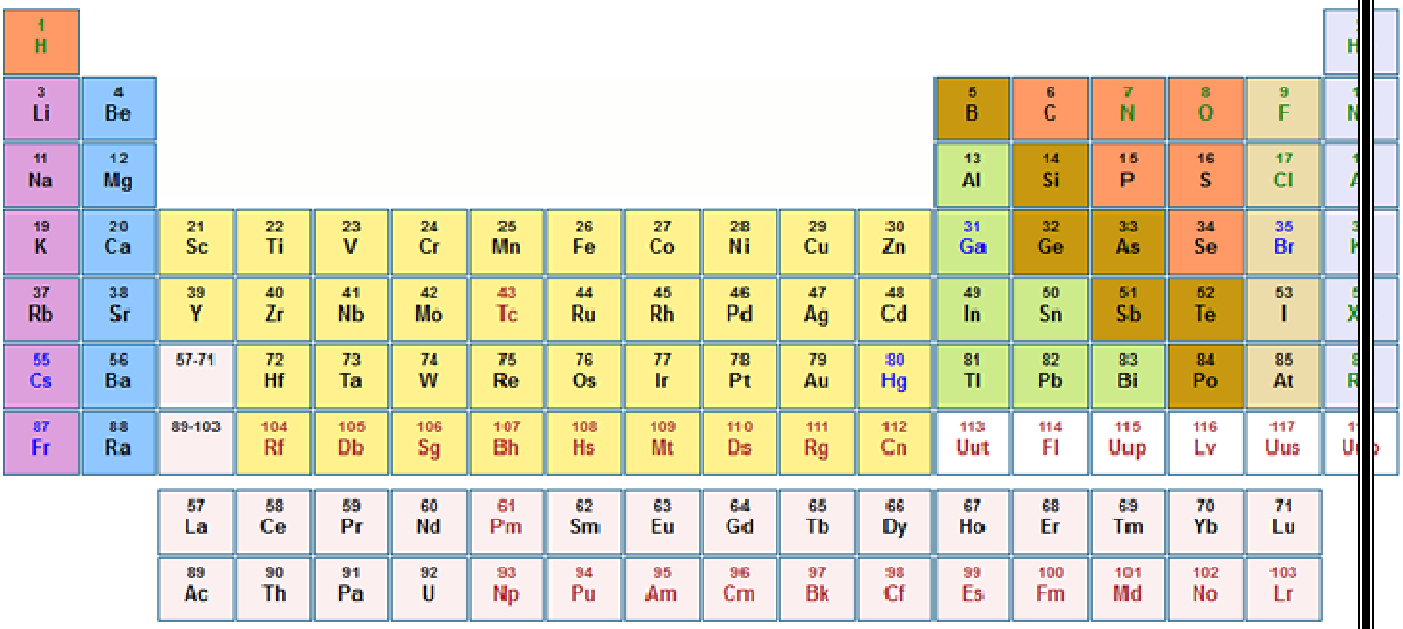
(b) The number of neutron is an atom of x

(c) The number of element in an atom of x

(d) The mass of number of x

If another atom is represented as $^{18}_{8}x$, what form could be used to state its relation to $^{16}_{8}x$ and what's the difference between them in term of the number and situation of particles present? If a sample of x contained 90% of $^{16}_{8}x$ and 10% of $^{18}_{8}x$, show that the relative atomic mass of x would be 16.2

PERIODIC CLASSIFICATION



PERIODIC TABLE

Definition: is the chart / table which shows the arrangement of elements in order of increasing atomic numbers in such a way that elements with similar properties fall in the same vertical column.

PERIODIC LAW

States that "The properties of elements are periodic function of their atomic number in the periodic table".
Periodicity - These are regular periodic changes of elements due to their atomic number

In the periodic table; elements are arranged in **groups** and **periods.**

1. **PERIODS** - are the horizontal row of elements in the periodic table.
2. **GROUPS** - are the vertical columns of elements in the periodic table.

GROUPS:

There are eight groups in the periodic table .Groups are usually indicated by roman number eg, I, II,III,IV,V ,VI,VII,VIII. Its important to note that the group number signifies the number of electrons in the outer most shell .The group are numbered from left to right.

NOTE;

Lanthanide series are part of period 6 ,Actinides series are part of period 7.

PERIODS:

These are seven horizontal rows in the periodic table. Periods are usually indicated in normal numbers eg , 1,2,3,4,5,6,7,. It is important to note that elements with the same number of shells belong to the same group.

Properties of element within a group

Group 1 elements (Alkali metals)

> They are known as Alkali metals , they include Li, Na, k .....

> They are called alkali metals because they all react with water to form alkali.

> They have one electron in their outer most shell.

Group 2 elements (Alkaline earth metals)

> They are called alkaline earth metals because their oxides are alkaline in nature and exist in earth eg, Be, Mg, Ca ,they have 2 electrons in their out most shell.

Group 7 elements (Halogens)

> Are called halogens because they react with metals to form salt .

> They have seven electrons in outer most shells eg chlorine, fluorine

Group 8 element (Noble gases)

>These elements are very stable .Their outer most shells are full of electrons .

> They have 8 electrons in their outer most shell.

General periodic trends

The trends observed include variations in:

1). Melting point - This is the temperature at which a solid melts to form liquid.

2). Boiling point - This is a temperature at which a liquid boils form a gas.

3). Density - This is mass per unit volume of a substance.

4). Electronegativity -Ability of an atom to attract an electron.

5). Ionization energy - This is the energy required to remove electron from an atom or ion.

6). Atomic radius - This is the distance between the nucleus of an atom and the outer most

stable energy level.

Trends across periods

1). The atomic radius of element in a period decrease from left to right

2). Elements to the left of the periodic table show metallic properties while elements to the right show non -metallic properties.

3). Electronegativity increases from left to right

4). The number of electrons and protons increase from left to right

5). The physical states of elements at room temperature 20ºc move from solid to gas

General group trends

1). Atomic radius increases down the group as successive energy levels are filled.

2). Densities increase down the group.

3). Melting point decreases down the group as the element becomes less metallic in nature.

4). Electronegativity and ionization energy decrease down the group.

TRANSITION METALS

Properties;

1. They are denser metals.
2. They are strong high melting point.
3. They form colored compound.
4. They form insoluble oxide hydroxide.
5. They can show the number of valency state (oxidation state) (have variable valency).

FORMULAR BONDING AND NOMENCLATURE

BONDING: Is the process where atoms combine to form a molecules.

BOND: Is a force of attraction that holds atoms together to form molecules.

The stable structure can be formed by either;

- Gain of electrons.
- Loss of electrons.
- Sharing of electrons, i.e: The number of electrons loss , gain or shared is equal to the valence of an element.

TYPES OF BONDING

There are two types of bonding;

1. Electrovalent bonding / Ionic bounding
2. Covalent bonding

1. ELECTROVALENT BONDING

Is the type of bonding where atoms gain or loss one or more electrons and stable inert configuration is attained.

OR

Is the type of bonding which involves the transfer of electron from one atom to another where both atoms acquire the stable structure.

STRUCTURE OF NOBLE GASES

Example;

- Sodium, chlorine NaCl

  -Electronic configuration NaCl

  -2:8:1 sodium

  -2:8:7 chlorine

- A sodium is one electron more than Neon 2:8 and chlorine is one electron less to Argon 2:8:8.
- The sodium (Na^+) and chlorine Ion (Cl^-) attack each other by an electrostatic force and the bond between them is ionic or electrovalent.

Before Combination	after Combination
Na^+ 2:8(1)	Na^+ 2:8
Cl^- 2:8:7	Cl^- 2:8:8

Example 2: Magnesium oxide.

Before combination	After combination
Mg = 2:8(2)	Mg^{2+}=2:8
O = 2:6	O = 2:8

- Other example of electrovalent compound is; MgO, NaS, O, MgS, K_2O, $CaCl_2$, $ZnCl_2$

- The electron gained or lost by one atom of an element during chemical combination so as to obtain a stable structure is called **electrovalent**.

PROPERTIES OF ELECTROVALENT/IONIC COMPOUND

1. Ionic compound do not exist in Molecules.
2. They are electrolyte conduct electricity when is molten shall.
3. The lattice structure of this compose to cause high melting point
4. Most of them are soluble in water but insoluble in organic compound.

2. **COVALENT BONDING**

Is a bond formed due to equally sharing of electron from each atom to gain a stable structure.

- Compound formed by sharing electron are known as **COVALENT COMPOUND.**

Example:

1. Formations of hydrogen Molecules (H_2) hydrogen atom contain one electron in its outer most shell. In order to form hydrogen Molecules both atom share one electron each so as to form compound properties of two electrons.

PROPERTIES OF COVALENT COMPOUND

1. Consist of Molecules (not ions).
2. Are usually gases / liquid with low boiling point and melting point.
3. Are insoluble in water, soluble in organic compound.
4. Not electrolyte (do not conduct electricity).

DIFFERENT BETWEEN ELECTROVALENT AND COVALENT BONDING

ELECTROVALENT	COVALENT
i) Are crystalline solid.	Most of them are liquid.
ii) Have high melting and boiling point.	Have low melting and boiling point.
iii) Are insoluble inorganic solvent.	Are soluble in organic solvent.
iv) Consist of Ion e.g. Na^+, Cl^-	Consist of molecules e.g. H_2
v) It molten state conducting electricity.	They do not conduct electricity.
vi) They are soluble in water.	Are insoluble in water.

VALENCE AND CHEMICAL FORMULA

VALENCY

Is the number of electrons which an atom of element must gain, lose or share in order to attain stable configuration.

OR

Is the combining power (capacity) of an element

OR

Is the number of electrons which are available for chemical bonding in an atom.

- The valencies of most elements many be deduced from the group number.

  E.g.

GROUPS	ELEMENTS	VALENCY
I	Lithium Sodium Potassium	1
II	Beryllium Magnesium Calcium	2
III	Boron Aluminium	3
IV	Silicon Carbon	4

- Valencies of element in group V - VIII their valency is deduced (calculated by taking 8 minus number of group).

Example of group ; V = 8 —5 = 3

VI = 8—6 = 2

VII = 8 —7 = 1

VARIABLE VALENCE

- Some element have more than one valency these element we say that they have variable valence.

Example:

Iron (Fe) ⟹ II or III (2 or3)

Lead (Pb) ⟹ II or IV (2 or 3)

Sulpher (S) ⟹ II or IV or VI (2 or 4 or 6)

Copper ⟹ I or II (1 or 2)

NB: If an element have variable valency it must be shown in all its compound using roman number in their name.

Example;

- Iron (II) sulphate - $FeSO_4$
- Iron (III) sulphate - $Fe_2(SO_4)_3$
- Copper (I) sulphate - Cu_2SO_4
- Copper (II) sulphate - $CuSO_4$

VALENCIES OF COMMON ELEMENT, METAL AND NON METAL

NAME OF ELEMENT	VALENCY	IONIC SYMBOL	OXIDATION STATE
Sodium	1	Na^+	+1
Potassium	1	K^+	+1
Aluminium	3	Al^{3+}	+3
Iron (II)	2	Fe^{2+}	+2
Iron (III)	3	Fe^{3+}	+3
Barium	2	Ba^{2+}	+2
Calcium	2	Ca^{2+}	+2
Copper (I)	1	Cu^+	+1
Copper (II)	2	Cu^{2+}	+2
Magnesium	2	Mg^{2+}	+2

Zinc	2	Zn^{2+}	+2
Lead	4	Pb^{4+}	+4
Mercury (I)	1	Hg^{+}	+1
Silver	1	Ag^{+}	+1
Nickel	1	Ni^{+}	+1
Chlorine	1	Cl^{-}	-1
Bromine	1	Br^{-}	-1
Iodine	1	I^{-}	-1
Sulphide	2	S^{2-}	-2
Oxide	2	O^{2-}	-2

simple formula of binary compounds

Binary refers to compounds that contain just two ions. Inorganic compounds fall mainly into two main categories namely ionic and covalent

Binary ionic compound ,

ionic compounds are formed when a metal combines with a non- metal.
⇒ Steps to follow when naming binary compounds .

1. Name the metallic ion that appears first in the formula using the name of the element itself.

2. The anion part in the compound will end in “ide”

Example ; oxygen become oxide

hydrogen become hydride

chlorine become chloride

NOTE;
Some metal always have the same charge when they form ions i.e

Group I metal → +1

Group II metal → +2

Zinc (Zn) → +2
aluminum (Al) → +3
Silver (Ag) → +1

Other metals are multivalent and thus form more than one ion

iron (Fe) bivalent →+2,+3

copper (Cu) bivalent → +1,+2

Compounds formed from these metals must be distinguished by starting which of the ions is in the compound.

Example 1;
What is the name of the compound with formula $FeCl_3$?

soln

The total charge of $Fecl_3$ is zero Cl- has negative charge

Therefore (i) let x be the valence of Fe atom

(ii) $1(\times) +3(-1)= 0$

(iii) $x = +3$

(iv) so the oxidation state of Fe is +3 ,the name will be iron(iii) chloride,since chlorine becomes chloride .

Example 2;
What is the name of compound of formula CuS.

(I) let x the valence of Cu

(ii) Sulphur has -2 charge

(iii) $1(x) + 1(-2)= 0$

$x = +2$

The compound is copper II sulphide since sulphur becomes sulphide .

QUESTION

What the names of the following compound with

(i). MgO

(ii). MnO_2

(iii) $AlCl_3$

Binary covalent compound

covalent compounds are formed between two non -metal elements .These compounds are named differently from ionic compounds.

Number	prefix
1	Mono-
2	di-
3	Tri-
4	Tetra-
5	Penta-
6	Hexa-
7	Hepta-
8	Octa-
9	Nona-
10	deca

Steps to consider when writing the names of binary covalent compounds.

1. Give the name of the first element

2. Give the name of the second element with the ending changed to ide.

3. If more than one compound is possible between the two elements, give prefixes to indicate the number of atoms of each element.

Example;

1. (i) Give the name for PCl_3

(ii) Since there is one phosphorous atom, we use it as the first part of the name

(iii) There are three chlorine atoms, some use " tri " in front of chlorine. We then drop "ine" in chlorine and replace with ide.

The name is phosphorous trichloride

2.What is the name for N_2O_4

(i) Use the prefix "di" in front of nitrogen

(ii) Use the prefix " tetra" in front of the oxygen

(iii) We drop "y gen" and replace with "ide"

The name is dinitrogen tetraoxide

Some binary covalent compounds

formula	name
CO_2	Carbon dioxide
SF_6	Sulphur hexafluoride
N_2O_5	Dinitrogen pentaoxide
NO	Nitrogen monoxide
CO	Carbon monoxide
HCl	Hydrogen chloride

RADICAL

Is the group of atoms that act as a single atom but does not exist independently (on its own). Radicals react through many different reactions behaving in many ways like a single atom.

Radicals exhibit its constant valency E.g. SO_4 , CO_3. Radicals are assigned a valency in the same name as an element.

All radical are either positively or negatively charged, but the most radicals are charged negatively. The only radical charged positively is **Ammonium (NH^+_4)**.

NAME	RADICAL	VALENCY	OXIDATION STATE
Ammonium	NH^+_4	1	+1
Sulphate	SO_4^{2-}	2	-2
Carbonate	CO_3^{2-}	2	-2
Hydrogen Carbonate	HCO_3^-	1	-1
Hydrogen sulphate	HSO_4^-	1	-1
Chlorate	ClO_3^-	1	-1
Nitrate	NO_3^-	1	-1
Nitrite	NO_2^-	1	-1
Hydroxide	OH^-	1	-1
Phosphate	PO_4^{3-}	3	-3
Sulphite	SO_3^{2-}	2	-2

EMPIRICAL AND MOLECULAR FORMULA.

EMPIRICAL FORMULA : Is the simplest formula which expresses its composition by mass.

STEPS FOR CALCULATING EMPIRICAL FORMULA.

1. Write down symbols of the elements e.g. sodium 'Na'.
2. Write the percentage weight or mass of the element.
3. Write the relative atomic mass of each element.
4. Divide percentage by R.A.M
5. Divide by smallest number.

MOLECULAR FORMULA

Shows the actual number of each different atom in a molecule.The molecular formula = n(empirical formula) where "n" is the whole number.

EXAMPLE :

1. A compound R contains 80% of carbon and 20% of hydrogen. If the molecular weight of compound is 30g find;

(i) Empirical formula

(ii) Molecular formula C = 12 H =1

Solution

Element	C	H
%	80	20
R.A.M	12	1
Divide by R.A.M	$\frac{80}{12} = 6.7$	$\frac{20}{1} = 20$
Divide by smallest number	$\frac{6.7}{6.7} = 1$	$\frac{20}{6.7} = 3$
Ration	1	3

(ii) Molecular formula The empirical formula CH_3

(E.F)n = M.WT

(CH_3)n = 30g

(12 + 3)n = 30

15n = 30
15 = 15

n =2

M.F = (E.F)$_n$

M.F = (CH_3)$_2$

M.F = C_2H_6

The molecular formula is C_2H_6

REVIEW QUESTION

(1) Define

(a) Molecular formula

(b) A certain compound Q has molecular weight of 60g and has 40% carbon hydrogen 6.67% and X % of oxygen .Find molecular formula.

OXIDATION STATE / OXIDATION NUMBER

Oxidation state is the number of electrons an element has lost, gained or shared by an atom of the element ,with respect to its neutron atom.

Rules used to assign oxidation state.

1. The oxidation number of (neutral) atom and molecules of an element equals zero.

2. The oxidation number of mono-atomic ion equals the charge of that ion

3. In neutral molecules the sum of oxidation number adds up to zero

4. The sum of oxidation number on a polyatomic ion must be equal to the charge of that ion

5. Fluorine always has -1 oxidation number within compounds.

6.Oxygen has an oxidation number of -2 in compound expect

(i) In the presence of fluorine in which fluorine oxidation number takes precedence

(ii)In oxygen - oxygen bonds, including peroxide and super oxide ,where one oxygen must neutralizes the others charge.

7. Group I ions have an oxidation number equal to +1 within compounds.

8. Group II ions have an oxidation number of +2 within compounds.

9. Halogens ,besides fluorine ,generally have -1 oxidation number in compounds .This rules can be broken in the presence of oxygen ,sometime,nitrogen or other halogen where the oxidation number can be positive.

10. Hydrogen always has an oxidation number of +1 in compound with the more electronegative element namely C,N,O,F,S,Cl,Se,Br and I with all others it is -1

Elements	Usual oxidation	Exception
Group I metals	Always +1	
Group II metals	Always +2	
Oxygen	Usually -2	Except in peroxides and F_2O
Hydrogen	Usually + 1	Except in metal hydride where it is -1
Fluorine	Always – 1	
Chlorine	Usually -1	Except in compound with O or F

•When an element is alone and its oxidation state is zero **e.g.** Mg = 0 , S = 0, Ca = 0. Oxidation state of charged atom is the charge of that atom.

E.g. $Mg^{2+} = +2$

$K^{+} = +1$

Oxidation state of free radical is **ZERO.**

E.g. $SO_4 = 0$

$CO_3 = 0$

$CL = 0$

But Oxidation state of charged radical is the charged of it;

E.g. $SO_4^{2-} = -2$

$CO^{2-}_3 = -2$

$CL^{-} = -1$

RELATIONSHIP BETWEEN VALENCY AND OXIDATION STATE

VALENCY	OXIDATION STATE
- Valence is fixed value.	- Is a orbitary assignment.
- Have no charge (positive or negative	- Is a assigned charges positive or negative.
- Valency of an element in a compound can not be calculated thus it is fixed.	- Oxidation number of an element in a compound may be inspected or calculated.

Example:

1. Find the oxidation states of chlorine in the compound K**Cl**O_3

Solution

The oxidation number of potassium is $^{+}1$

The oxidation number of Oxygen is $^{-}2$

$(^{-}2 \times 3) \div ^{-}6$

$KClO_3$ its oxidation state is Zero

Therefore

$KClO_3 = ^{+}1 + CL + (^{-}2 \times 3) = 0$

$KClO_3 = ^{+}1 + CL - 6 = 0$

$KClO_3 = CL - 6 = 0 - 1$

$CL - 6 = -1$

$CL\ 6+6 = -1+6$

$CL = ^{+}5$

Oxidation state of chlorine in $KClO_3$ in $^{+}5$

Solution

The total charge of sulphate ion is $^{-}2$

$SO4^{2-}$

$S + (^{-}2x4) = ^{-}2$

$S + (^{-}8) = ^{-}2$

$S - 8 = ^{-}2$

$S - 8 + 8 = ^{-}2+8$

$S = ^{+}6$

The oxidation state of sulphur is $^{+}6$

Example

2. Calculate the oxidation state of the vanadium in vanadium oxide

Solution

The total oxidation number of V_2^0S = Zero

V_2S^0

$V_2+(^-2x5) = 0$

$V_2—10 = 0$

$V_2—10 + 10 = 0+10$

$V_2 = 10$

$2V = 10$

$V = +5$

Therefore the oxidation state of the vanadium is $^{+}5$

Find the oxidation of the underlined elements

(i) $\underline{KMnO_4} \longrightarrow$ K Mn O

+1 X 4(-2)

1 + X - 8

X = 0 +8- 1

X = 7

∴ Mn = +7

(ii) $\underline{Cr_2O_7^{2-}} \longrightarrow Cr_2 \quad O_7^{2-}$

2x 7(-2)

2x + 7(-2) = -2

2x – 14 = -2

2x = 14 -2

$\frac{2x}{2} = \frac{12}{2}$

X = 6

∴ Cr_2 =+6

(iii) $\underline{Fe_2}(CO_3)_3 \longrightarrow Fe_2 \quad (CO_3)_3$

2X 3(-2)

$\frac{2X}{2} = \frac{6}{2}$

X = 3

∴ Fe_2 = +3

FUEL

Is the form of matter that is used to produce energy or power by burning e.g. Fuels of wood, and natural gas .These fuels are used as source of energy or power in homes, industries and in transportation in ruining automobiles, rails and airplane

SOURCE OF FUEL

The materials used as fuels are generally grouped as BIOMASS and fossils fuel

BIOMASS FUELS

Are fuels which originate from recent materials of plant and animals example are dry wood, dry weed, agricultural wastes and biogas.

FOSSIL FUELS

Are fuels which are preserved in the earth crust as remains of plants and animals example coal, petroleum, and natural gas

HOW FOSSIL FUEL OCCURS

It is believed that millions of years ago animals and vegetable matters were burried beneath the earth due to certain natural calamities such as flood, earthquakes cyclones, and storms

Under high temperature and pressure inside the earth these materials were subjected to decomposition in absence of air to from coal, petroleum and natural gas.

COAL

Is a natural occurring black material.It consists of large percentage of carbon mixed with some other minerals. Coal is the most abundant commercial energy resources in Tanzania, the coal mines in southern part of Tanzania: Lindi, songwe, and kiwira.
Products of coal are: coal tar, coke, ammonial liquor

USES OF COAL PRODUCT

1 .Coal tar is used to make other chemicals like benzene, toluene, phenol and naphthalene

2. Coal gas is used as fuel.

3. Used as reducing agents in extraction of metals e.g. Extraction iron metal

4.Ammonial liquor is used in manufacture of fertilizer.

PETROLEUM (CRUDE OIL)

Is a complex mixture of more than hundred hydrocarbons and is highly viscous liquid and it has characteristic bad smell.
Origin of petroleum
Petroleum has been produced in millions years by the bacteria decomposition, animals and plants which were buried underground in the earth crust due to earthquake, cyclone, and storm.

DRILLING OF OIL WELLS

Petroleum Is obtained by drilling holes in the earth crust at the place where the presence of oil is indicated by surveyors .Also can be obtained by drilling under the sea (what a called shore wells)

PETROLEUM REFINING

Is the mixture of different materials, it must be separated into useful products .The process used to separate is called refining of petroleum. The method used to refine petroleum is known as fraction distillation

Products of petroleum

Kerosene, Gasoline, Gas oil, Diesel, Lubricating oil, Grease, Vaseline and paraffin wax.

NATURAL GAS

Is obtained by drilling deep holes which is known as oil wells, the gas obtained is transported in cylinders and pipelines.

Natural gas consists of methane (CH_4) and small amount (proportion) of Ethane C_2H_6 (in Tanzania natural gas is obtained from songosongo)

Production of wood charcoal in rural area

Wood charcoal are made by burning wood in insufficient supply of air (destructive distillation of wood)

1. Τηε τρεεσ αρε χυτ δοων ιντο σμαλλ πιεχεs
2. ~~ccccccc~~Τηε πιεχεσ αρε αρρανγεδ ιν α πιτ χλοσεδ χονταχτ ωιτη εαχη οτηερ.
3. Then they are covered by soil material which limits air supply.
4. Therefore the fire is set to burn pieces of woods.
5. After 3 or 4 days the pit is uncovered to get the charcoal.

The charcoal obtained is a black light porous substance which absorb gas readily

Uses of wood charcoal

1. Used in gas masks to absorb any poisonous gases present in a particular area
2. Is the main domestic fuel in rural areas

Characteristic of good fuel

1. They should have high heat content i.e they must produce a lot of energy.
2. They must be cheap
3. They should have little or no product like ash and smoke
6. They must not give off dangerous by products like poisonous fumes
7. They should be easily stored and transported
8. The should be easily controlled

Categories of fuel

(i) Solid fuel e.g. charcoal, fire wood.

(ii) Liquid fuel e.g. Kerosene, petrol.

(iii) Gaseous fuel e.g. Water gas ,producer gas

SOLID FUELS,

Are obtained from trees and plants either directly as wood or as fossil remains of vegetable matter that were buried deep underground in post geological ages

Advantages

1. Are cheap
2. Are easily to obtain e.g. fire wood

Disadvantages

1. Require much space for storage
2. Leave smoke and ash on burning e.g. . fire wood
3. Low heat content.

LIQUID FUELS

Are obtained from petroleum e.g. Kerosene, diesel, gasoline.

Advantages

1. They have no solid residue when they burnt
2. They require less storage space than solid fuels.
3. High heat content compared to solid

Disadvantages

1. Are more expensive than solid fuel.
2. Are dangerous if not used in care.

GASES FUEL

These includes biogas, coal gas, water gas, liquefied petroleum (LPG) These fuel can flow through pipes.

Advantages

1. Do not leave reduce on burning

2. They have high heat content

Disadvantages

1. Very expensive

2. They are so dangerous if not used with care

Classification of fuel according to their efficiency

The efficient of a fuel explained in the form of the heat energy that can be produced when that fuel is completed. An efficient fuel is one which produce a lot of heat energy when a small amount of it is used and does not produce a lot of gaseous wastes into the environment .Gaseous fuels are more sufficient followed by liquid fuel lastly solid fuel .

1st Gaseous fuel e.g. Natural gases

2nd Liquid fuel e.g. kerosene

3rd Solid fuel e.g. Charcoal

CALORIFIC VALUE OF FUEL

Is the heat liberated on burning with mass of fuel .The calorific value is measured in colorimetric SI unit is kilojoules per kilogram (KJ/Kg) or kilojoules per grams.

A sample of fuel is weighed and burnt, the liberated heat used to heat a known mass of water and the rise in temperature of water gives an estimate of calorific value of fuel

Comparison of calorific value of some fuel

FUEL	CALORIFIC VALUE
Wood	16,200 kj/kg
Charcoal	31400 kj/kg
Coke	8600 kj/ kg
Kerosene	43,100 k/kg
LPG	46,000 Kj/Kg

Experiment

Aim; to determine the energy value of ethanol (alcohols). The experiment involves burning of mass of an alcohol. The heat produced when alcohol is burning known as mass of water.

The rise in temperature of water is recorded and the heat produced is calculated.

Materials: ethanol, water thermometer, small bottle, lamp, trough.

PROCEDURES

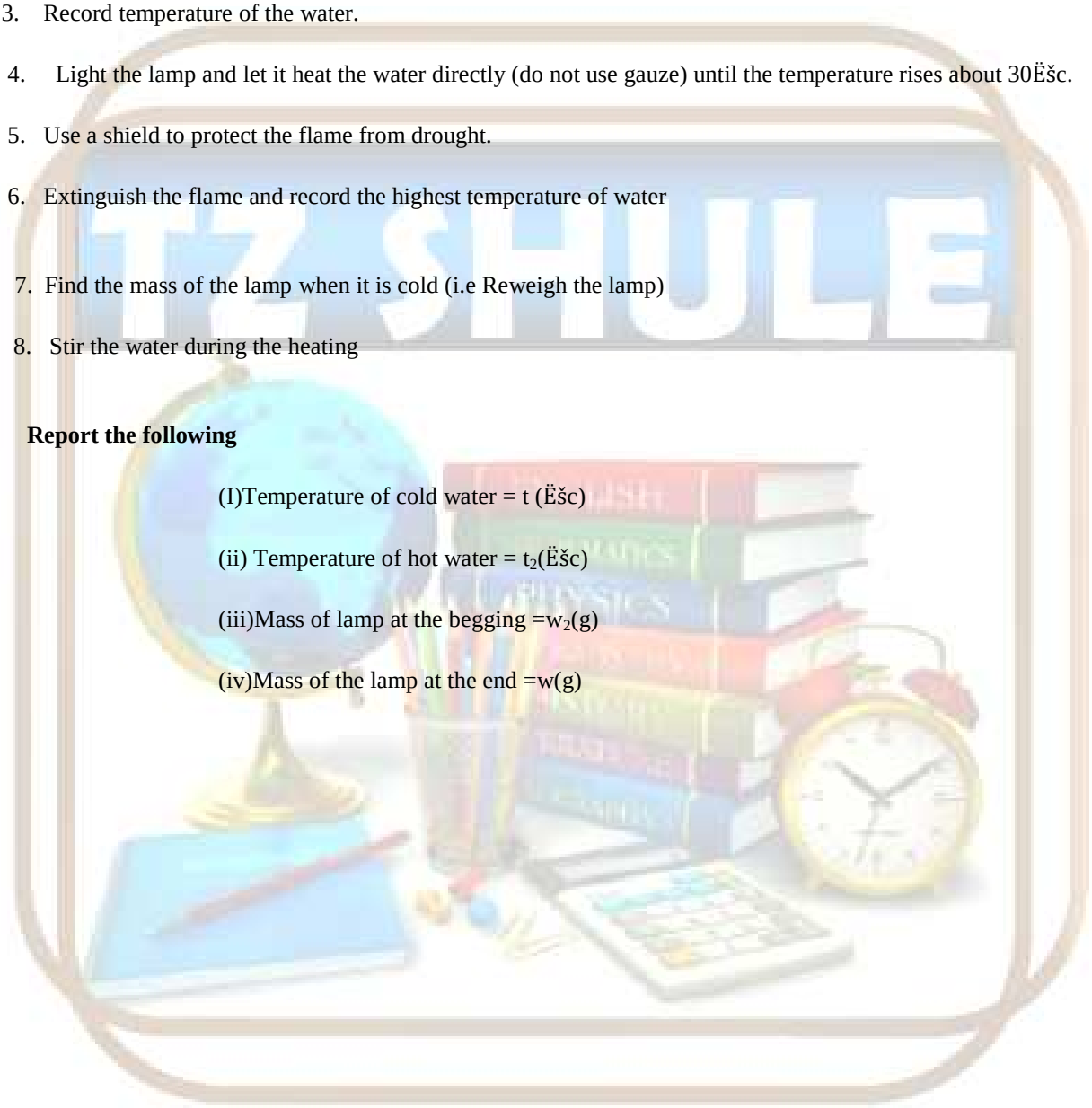
1. 1. Measure 250cm^3 (250g) of water in measuring cylinder and pour it to thin metal can
2. 2. Pour ethanol into small bottle fixed with cork and wick and find the mass of the simple lamp so formed (i.e bottle+cork+wick)
3. 3. Record temperature of the water.
4. 4. Light the lamp and let it heat the water directly (do not use gauze) until the temperature rises about 30Ëšc.
5. 5. Use a shield to protect the flame from drought.
6. 6. Extinguish the flame and record the highest temperature of water
7. 7. Find the mass of the lamp when it is cold (i.e Reweigh the lamp)
8. 8. Stir the water during the heating
9. **Report the following**

   (I)Temperature of cold water = t (Ëšc)

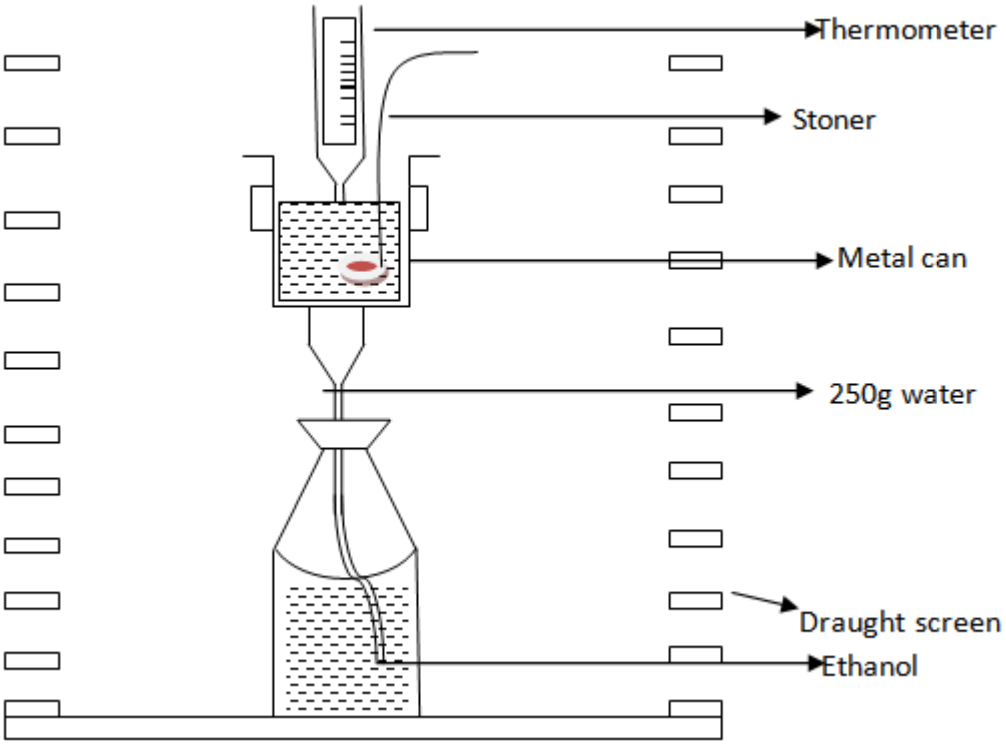
   (ii) Temperature of hot water = t_2(Ëšc)

   (iii)Mass of lamp at the begging =w_2(g)

   (iv)Mass of the lamp at the end =w(g)



(V) Specific heat capacity of water = 42Ëšc



The heat gained by the water = specific heat capacity x mass x rise in term of premature

$= 402 \times 250(t_2 - t_1)$ joules $= (t_2 - t_1)$ k

The mass of ethanol used $= (w_1 - w_2)$

The relater molecular mass of ethanol =46

$\therefore w_1 - w_2/46$ mole of ethanol produce $(t_2 - t_1)$ kJ

1 mole of Ethanol produce $t_2 - t_1$, $46/(w_1 - w_2)$ kilojoules

This is the energy value of ethanol. The results are much lower than an accurate value because some of the heat produced warm the can and the air so does not pass into the water.

Example

Calculate the heat obtained by burning ethanol using the information given:

Temperature of cold water = 25Ëšc

Temperature of warm water =45Ëšc

Mass of lamp at the beginning = 40.50g

Mass of lamp at the end = 40.00g

Volume of water = $100cm^3$

∴ Heat gained by water = heat obtained by burning ethanol

= volume x density

= $100\ cm^2$ x$1g/cm^3$

=100g

∴ Heat gained by water = specific heat capacity x mass of water x rise in temperature

= 4.2 j mole x 100g (45.25)x

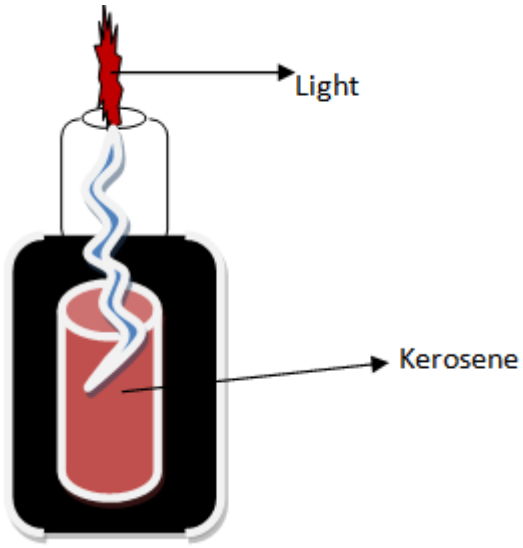
= 840000 joules

= 8.4kj

USES OF FUEL

Fuels are used in different ways in daily life

1. To run machines in industries and motor vehicles e.g. petrol, diesel and coke
2. For cooking ,boiling and provision of warmth at home e.g. fire wood, kerosene, coal and coke
3. For drying for example tobacco leaves are dried in kilns by burning woods.
4. For light at home especially rural areas where electricity is not available for example kerosene



THE ENVIRONMENT EFFECT ON USING CHARCOAL AND FIREWOOD AS SOURCE OF FUELS

Extensive harvest of plants /trees for fire wood and charcoal production would lead to environmenta effects such as deserts

Disadvantage of deforestation duel to fuel production

1. 1. Leave the land bare to agents of erosion like moving water, animals and winds.
2. 2. Affect the normal circulation of water that means effect water cycle.
3. 3. Destruction of the home for wildlife and this destructs the ecosystem

CONTRIBUTION OF VEGETATION IN BALANCING ATMOSPHERIC GASES

1. 1. Forests and other vegetation form a very important habitat for various kinds of wild animals and micro-species
2. 2. They are also source of food and wood.
3. 3. They attract the rain and help in balancing atmospheric gases.
4. 4. The well conserved vegetation helps at keeping the balance of gases in the atmosphere and environmental pollution caused by gases.

NB; In order to keep the balance gases recycling of the gases show be disrupted.

Example,

Carbornidioxide is added to the atmosphere through respiration .However, photosynthesis in plants remove the gas from the atmosphere as a result carbondioxide percentage the air stayed approximately constant, in this way gaseous pollution from motor vehicles, casual burning of substance and industry process is minimized.

ALTERNATIVE TO FIREWOOD AND CHARCOAL AS SOURCES OF FUEL

To avoid environmental hazard due to deforestation on alternative source of fuels must be encouraged

Renewable energy source; Are energy source that can be replaced by natural process

; Are fuel source that cannot be replaced with time

Examples of renewable energy source are ;

1. Solar energy –energy from the sun
2. Geothermal – energy source that is deep inside the earth
3. Wind – is the energy of moving air
4. Ocean waves
5. Tidal waves – is the energy of rising and falling tides
6. Biomass
7. Hydroelectric energy.

CONSERVATION OF ENERGY

- - Energy is ability or capacity of doing work
- - There are two kinds of the energy

(i)Potential energy

(ii) Kinetic energy

POTENTIAL ENERGY;

Is the energy in matter due to its position (rest) or state .Potential energy is stored in different forms e.g. coal petroleum, natural gas , elastic energy and gravitation energy

Such energy does not do work as it is stored .It is capable of doing work while when its changed to other form of energy e.g. heat ,light , e.t.c

KINETIC ENERGY:

is the energy possessed by the body due to its motion.


TZ SHULE