

MARKING GUIDE CHEMISTRY SET 1 2024

(a) Category/ type

Kawaga needed conventional/modern medicine instead of traditional/herbal medicine to handle his condition.

(b) Functions of the products (How it works)

- Conventional medicine is effective if properly used as prescribed in relieving pain and suppressing micro organism that cause the disease symptoms analgesic like paracetamol work to quickly release pain.
- Antibiotics are administered through injection to suppress the bacterial medicines that caused cough along with plasmodium that caused fever.
- However the traditional medicines Kawaga used to take is slow in action un processed but works also to kill pain or suppress bacterial attack

(c) dangers or side effects of products

- Both conventional and traditional /herbal medicine have side effects for example some pain killers like aspirin can cause blood clot which may be fatal.
- Antibiotics can cause liver damage whereas some traditional medicine contain alkaloids which are potentially toxic alkaline compounds.

(d) Evaluation of the products

Similarities

- Both medicines cure diseases.
- Both have harmful side effects
- Both are prepared and work well on prescribed doses

Differences

- Modern medicine require a trained personnel to prescribe the right dose whereas traditional medicine can be taken in any amount.
- Modern medicine lasts longer in shelf but traditional medicine cannot last for long periods
- Modern medicine is more effective and quick in treatment while most herbal medicine is slow in action

Item 2

(a) (i)Category of elements, compounds, substances or materials with a reason.

The materials builders abandoned can be classified into metals and non-metals;

Metals are hard, strong, sonorous and none biodegradable such as iron nails, plates, wires and sheets

Non metals are either synthetic or natural e.g cotton cloth is a natural polymer while nylon nets and polythene materials are synthetic polymers and man made.

(ii) properties of the materials

Metals like iron are used in the construction because it has properties that render it suitable e.g

- It is very hard and can resist breakage or support heavy weight.
- Resistant to high temperatures
- Rusts when exposed to moisture and air. Must be galvanized to resist rusting
- It is ductile and can be drawn into wires for binding
- It is malleable and can be drawn into sheets for roofing

Cotton is a natural polymer which is biodegradable and safe to dispose when old

- Is cool and comfortable to put on.
- Soft and does not irritate the skin
- Is cheap and can be easily processed from local materials.

Polythene is a synthetic artificial polymer that is non-biodegradable used to make damp proof course

- Can be recycled.
- Is water proof so protect the walls from absorbing water
- Is light and lasts long

(b) Suitability of the material for use

- Iron nails are strong and long lasting. They are used to bind pieces of wood/ timber together or iron sheets to the rafters when roofing
- Iron sheets are galvanized so do not rust and are water proof hence used for roofing
- Pieces of iron sheets are resistant to high temperatures and water so form good roofings to prevent rain into the house.
- Iron sheets can be coloured to give the house nice look
- Polythene are water proof and long lasting to form a damp course while laying the foundation of the building
- Cotton textile is a fabric that is comfortable and warm for making cloth

(c) Impact of the material on the environment

- Iron is non- biodegradable, can deplete the soils when left to accumulate in the environment
- Polythene is non-biodegradable and can lead to pollution of water bodies or prevent water penetration into the soil, when burnt pollutes the air by adding greenhouse gases
- Cotton has no side effect on the environment

Section B

Item 3

(a) Raw materials

Copper is the material that can be extracted to improve electricity conductivity in the country.

The raw materials are;

Copper pyrites, ore, water, special oils, acids, copper II sulphate and silicon IV oxide

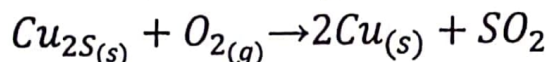
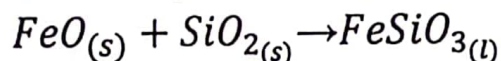
(b) process of production.

- The extraction of copper from its ore requires concentration of the ore by froth floatation method.
 - Roast in air to obtain copper II sulphide
 - Removal of impurities and purification of blister/impure copper by electrolysis
 - Copper pyrites are crushed and added into a tank containing water which is mixed with some oils
 - Air is blown into the mixture to separate out copper ore to the oil layer on the surface while the useless rock materials dropped to the bottom of the tank
 - The copper ore is skimmed away dried and roasted in a large supply of air
- $$2CuFeS_{2(s)} + 4O_{2(g)} \rightarrow Cu_2S_{(s)} + 2FeO_{(s)} + 3SO_{2(g)}$$

(or word equation)

The mixture of iron oxide and copper (I) is mixed with silicon IV oxide heated in supply of air. Iron oxide reacts with silicon IV oxide to form iron II silicate/slag which is separated out

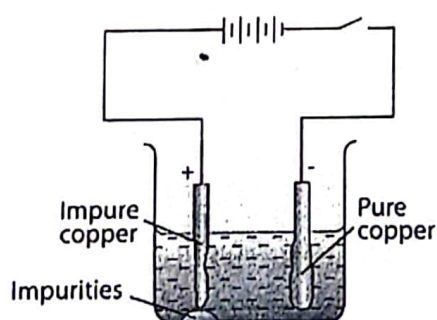
Copper I sulphide is heated in a regulated supply of air to obtain blister copper.



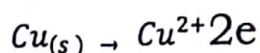
Finally the impure copper is purified by electrolysis using a pure copper strip as the cathode while the impure copper is the anode and copper II sulphate is used as the electrolyte

The anode dissolves and gets coated on the cathode as the impurities drop at the bottom

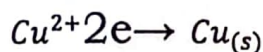
Alternative



At the anode

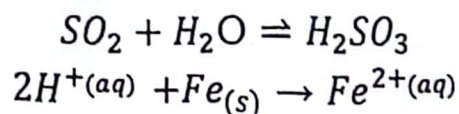


At the cathode



(c) **side effects of the process of production and mitigation**

Air pollution by the sulphurdioxide evolved can cause acidic rain which can corrode roofs of iron buildings



Mitigation

Fitting catalytic converters

In exhaust pipes of machines to convert sulphur dioxide to sulphur that is harmless or dissolve sulphur dioxide in water to form sulphur ions acid that can be converted into material for bleaching paper

Social benefits

Employment opportunities, members earn income therefore better standards of living.

Improved road networks therefore easy transport of materials by the residents

Or

Hospitals and schools can be built hence improve health and education levels.

Item 4

(a) **Raw materials**

Oil is extracted from crude oil/petroleum

(b) Crude oil processed into oil in a refinery.

The process of production requires heating the oil and separating it into various components or fractions such as gasoline diesel and lubricants based on their boiling points.

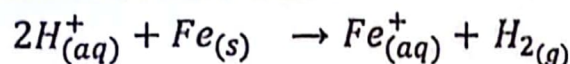
Refining crude oil usually is carried out in the ocean to evade its impacts on the environment. This refining crude oil transforms oil into usable products like gasoline naphtha, kerosene, diesel lubricating oil and bitumen used for surfacing roads

Side effects of the process of production and mitigation

Various environmental effects including air and water pollution, habitat destruction plus production of greenhouse gases that contribute to climate change through reflection of heat back to the earth causing global warming. The fossil burn to form pollutant gases that cause acid rain like

carbondioxide $CO_2 + H_2O \rightleftharpoons H_2CO_3$

The acid rain corrodes roofs made of iron.



(Or equivalent)

Mitigation

Use catalyst converters to convert pollutants into harmless substances
Plant trees to avoid accumulation of carbondioxide to harmful levels in the atmosphere.

(d) Social benefits

Improve road infrastructure so transport of products to market is simplified
or alternative

Item 5

(a) Identity/category of the natural resource, reason and example

The vehicle effects

Air is a natural resource that organisms depend on for survival.

Air is a renewable natural resource because it can be replenished whereas the other natural resources which non-renewable like fossil fuels because they get used up.

(b) composition of the natural resources

Air contains gases like oxygen, nitrogen, carbondioxide, water vapour and pollutants

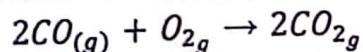
Fossil fuels in car engines contain carbon, hydrogen and lead additives.

(c) impact of the natural resource on the environment and how it works

Air

Some components of air pollutes the environment and cause greenhouse effect e.g carbondioxide traps heat and cause global warming.

Carbomonoxide uses up the available oxygen to form carbondioxide.



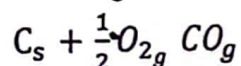
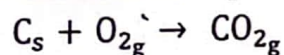
It is produced by incomplete combustion of hydrocarbons or fossil fuels

Mitigation:

Increased re afforestation so that trees remove carbondioxide in photosynthesis

Afforestation to increase vegetation cover to absorb carbondioxide.

Fossil fuels undergo complete combustion in engines to release carbondioxide or incomplete combustion to produce carbomonoxide



Lead in the exhaust fume emissions cause lead poisoning

Carbon monoxide cause death by suffocation

Mitigation

Increase on planting trees to absorb the greenhouse emissions

OR use unleaded fossil fuels

OR insert catalytic converters in exhaust pipes of vehicles to convert poisonous pollutant gases into harmless products

Install a chemical that can react with the lead to form a product like lead II bromide that is harmless.

Phasing out the use of lead fuels

Conducting soil remediation efforts in areas highly affected by lead poisoning.

Encourage use of electric vehicles that do not cause pollution

Educating the public about the dangers of lead exposure and promoting lead safe practices

Benefits

Air facilitates respiration where by oxygen is used to burn/oxidise the foods into carbondioxide and water with release of energy for performing body activities.



Or

Air contains carbondioxide which plants use in photosynthesis

OR

Fossil fuels are used as sources of energy to run the engine when burnt

Item 6

(a) Identity /category of natural resource, reason and example

There are two categories of natural resources- Renewable and non-renewable natural resources

Renewable natural resources can be sustained such as air, water, trees and grass whereas non-renewable resources cannot be replaceable e.g fossil fuels.

(b) Composition of natural resources

Trees and natural vegetation is made up of elements like carbon, hydrogen and oxygen

Air is made up of oxygen, carbondioxide, nitrogen, water vapour and pollutant gases

Soil has mineral irons, calcium, potassium, copper, sodium, lead and many other

(c) impact of the natural resource on the environment and how it occurs and mitigation(chemical physical reactions)

Impact to the environment; charcoal burning impacts negatively on the environment as it involves cutting down trees that result in;

Loss of habitat for wild life, exposure of soil to erosion, change in the water cycle that can bring about reduction in evapotranspiration and climate changes

Accumulation of greenhouse gases emissions in the air causing global warming of the atmosphere.

Heat from charcoal spoils the soil structure

mitigation

Re-afforestation to regenerate vegetation and trees which absorb carbondioxide and reduce greenhouse effect

OR
Seek for alternative clean and safe source of energy such as hydro-power or nuclear power.

Add humus to the soils to replace the burnt organic matter

(d) social benefits of the natural resource

- Clean air is used for respiration during which energy is released for performing work together with carbondioxide and water vapour. Plants need carbondioxide in photosynthesis
- Trees clean the air by removing greenhouse gases like carbondioxide and use it in photosynthesis
- Trees regulate the climate and water cycle through evaporation
- Trees and vegetation can be sources of herbal medicine for curing diseases.
- Forests form habitats for a diversity of many species of organisms

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