

~~PROPOSED ASSESSMENT GRID~~ BY SAMSON WABWIRE

Item 1

(a)

1pt

It is atomic bomb or Nuclear bomb.

This involved nuclear fission process.

Lighter nuclei (b) which can split

The nuclear fission releases energy through splitting of a heavy nucleus when it is bombarded by fast moving neutrons to produce lighter nuclei.

The energy released is used to generate electricity in the nuclear power plants.

(c)

Exposure to radiations released increases the risk of cancer leading into death of living organisms. This can be mitigated by proper use of required personal protective equipments.

(d)

$O_2 + O_2 \rightarrow O_3$ (mult)

$O_3 = O + O_2 \approx 0.001\% \text{ of air}$

start a chain reaction to start breaking down O_3 to O_2

the chain continues to break down O_3 to O_2

and so on until all O_3 is removed

O_3 (unpaired) contains unpaired electron \rightarrow e^-

$O_3 \rightarrow O_2 + O$

$O_2 + O \rightarrow O_3$

(e)

pollution due to industrial wastes \rightarrow Level 2

industrial wastes \rightarrow due to industrial wastes \rightarrow Level 2

industrial wastes \rightarrow due to industrial wastes \rightarrow Level 2

Item 2 part I

(a)

(b)

Carbon dioxide gas is a covalent compound since it is formed by sharing of outer most valence electrons between carbon atom and oxygen atom.

Calcium oxide is an ionic compound since it is formed through transfer of valence electrons from a metal atom to a non-metal atom.

Ans. (a) CO₂ is a covalent compound.

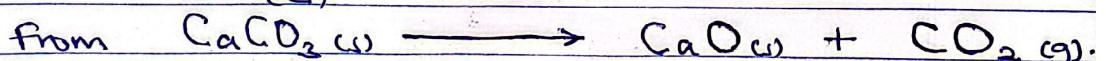
Ans. (b) CO₂ is soluble in water thus used for carbonation in beverages.

CO₂ is non-combustible, hence used in fire extinguisher.

CO₂ reacts with water to form carbonic acid hence used in pH control.

CO₂ does not conduct electricity.

(c)



$$\text{R.P.M. of CaCO}_3 = 40 + 12 + 16 \times 3 = 100\text{g.}$$

1 mole of calcium carbonate decomposes to produce 1 mole of carbon dioxide gas.

100g of calcium carbonate produces 22.4L of carbon dioxide at S.T.P.

25g of calcium carbonate produces $\left(\frac{25 \times 22.4}{100}\right)$ g of CO₂
 $\Rightarrow 5.6\text{ L of CO}_2$ at S.T.P.

(d)

When the level of carbon dioxide accumulates in the atmosphere, it results into global warming since it traps heat therefore a green house gas.

house gas leading to drought. This can be mitigated by practicing afforestation since trees absorb carbon dioxide from the atmosphere.

Item 3

During the extraction of copper, the following industrial processes are involved.

The copper pyrite is concentrated by froth flotation in a container.

The concentrated copper pyrite is then roasted in air to produce copper (II) sulphide, iron (III) oxide and sulphur dioxide gas.

The silicon dioxide is then added to the mixture and heated in absence of air in a furnace.

The iron (III) oxide is reacted with silicon dioxide to form molten slag of iron(II) silicate.

The copper (I) sulphide is heated in controlled amount of air to form impure copper.

The impure copper is purified by electrolysis using impure copper as the anode and pure copper as the cathode in an electrolytic cell containing acidified copper (II) sulphate solution as the electrolyte.

At the Cathode.

Copper (II) ions are discharged to form copper which is deposited at the cathode and collected as pure copper.

Side effects of copper extraction and mitigation.

In the process of production of copper, sulphur dioxide gas is released into the atmosphere as a bi-product, since it is an acidic gas, it dissolves in water forming acidic rains that lowers the soil pH. This can be mitigated by setting up a sulphuric acid manufacturing plant around the area to use the sulphur dioxide.

Social benefit of the copper extraction plant.

Since the plant requires workers therefore employment opportunities are created for the residents hence increased income, thus improved standards of living.

Item 4

The process of production of cement involves the following steps:

A mixture of Clay and Limestone is crushed into fine powder.

The fine powder is then mixed with little water and allowed to flow down into a cylinder in which it is strongly heated.

Limestone decomposes forming Calcium Oxide and carbon dioxide.

Calcium Oxide react with Silicon dioxide and aluminium Oxide to form calcium silicate and aluminium silicate, respectively as lumps.

The lumps are crushed to form Cement as fine powder.

Gypsum is added during the grinding process to moderate the setting of cement.

The cement is packed in bags and ready for use.

Side effects of the production of cement and mitigation.

During crushing process, dust particles are released into the atmosphere causing air pollution thus leading to respiratory disorders when inhaled by the workers. This can be mitigated by proper use of required personal protective gears.

Social benefit of the cement production plant.

It is a source of government revenue through taxation of cement produced and workers hence improved infrastructures like roads thus better standards of living among the locals.

Item 5

Category and chemical compositions of natural resources.

The natural resources are categorized as renewable resources, which can be replaced such as Vegetation, Water.

Vegetation is chemically composed of carbon, hydrogen, Oxygen, Magnesium depending on the soil compositions.

Impact of human activities on vegetation as a natural resource and how it is mitigated.

Bush burning; fire is set onto vegetation which destroys pastures, animal habitats. Hence resulting soil erosion leading to soil infertility. This can be mitigated by imposing strict government laws, and policies against bush burning.

Importance of vegetation as a natural resource.

Vegetations are used as habitats for wild animals like Monkeys since they provide hiding places and food for them.

Item 6

Rocks are classified as non-renewable resources which cannot be replenished.

Rocks as a natural resource is chemically composed of Calcium carbonate, Iron, Copper, Aluminium and among others.

Rocks as natural resources are affected by human activities and how they are solved. These include;

Stone Quarrying;

Rocks are broken down into small stones and gravels. This destroys habitats for wild animals like snakes hence leading to extinction of the species. This can be mitigated by implementing environmental regulations.

Rocks are very important in the environment as a natural resource.

Rocks contain minerals like Quartz which is used in electronic industry.