Candidate's Name: .....

Signature: .....

Random No.						Personal No.		

(Do not write your School/ Centre Name or Number anywhere on this Booklet.)

545/1
CHEMISTRY
Paper 1
Oct./Nov. 2024
2 hours

UGANDA NATIONAL EXAMINATIONS BOARD

Uganda Certificate of Education

CHEMISTRY

Paper 1

2 hours

INSTRUCTIONS TO CANDIDATES:

This paper consists of **two** *Sections;* **A** *and* **B.**

It has **six** *examination items.*

Section **A** *has* **two compulsory** *items.*

Section **B** *has* **two** *Parts;* **I** and **II.** Answer **one** *item from* **each** *part.*

Answer **four** *items in all.*

Answers to Section **A must** *be written in the spaces provided while those of section* **B must** *be written on the answer booklet(s) provided.*

Any additional item(s) answered will **not** *be scored.*

Use where necessary;
Ca = 40; C = 12; O = 16; 1 mole of a gas occupies 22.4 dm^3 at s.t.p.

SECTION A

Answer **both** *items from this section in the spaces provided.*

Item 1.

During the second world war, the cities of Hiroshima and Nagasaki in Japan were bombed using the most lethal weapon of the time, which caused massive destruction as shown in figure 1. However, the energy that was used can be useful in the treatment of cancerous growths in humans. Up to now the impact of the bombing is still being felt in Japan.

Fig. 1
https://www.pennlive.com

Task:

As a learner of Chemistry;

(a) identify the type of bomb used.

Atomic bomb; e.g Uranium based atomic bomb 01

(b) suggest any other use of the form of energy that was used in the bomb.

- Nuclear power plants are used to produce electricity
- Used in mutation breeding ; where genetic mutations are induced to improve crop yields.
- Used in pest control ; by sterilizing pests using radiations
- Used in sterilization of medical instruments. 04

(c) explain the other danger associated with the form of energy in the bomb and give its mitigation.

- Exposure to radiation increases cancer risk by workers and nearby population hence causing death. This can be mitigated by proper use of correct personal protective equipments. 01 01
- Radiations exposure can cause genetic mutation resulting into birth defects. This can be mitigated by proper disposal of nuclear wastes. 01 01

04

Max Score = 04

Item 2.

An industry wanted to produce lime for treatment of acidic soils. The production of lime involves heating limestone strongly which results into its decomposition according to the equation;

$$CaCO_{3\,(s)} \longrightarrow CaO_{(s)} + CO_{2(g)}$$

The industry is also interested to know how much gas is evolved during the process since the gas is useful.

Before the production, an experiment was performed where 25 g of limestone were heated until there was no further change. You have been contacted for help.

Task:

As a learner of Chemistry;

(a) explain the categories of the products.

The products are;

Calcium Oxide (CaO), which is an ~~alkaline~~ alkali earth metal oxide; a basic oxide 1c, 1c

Carbon dioxide gas (CO_2), which is an acidic oxide; a greenhouse gas. 1c, 1c

03

(b) suggest the properties of the gaseous product that make it useful in daily life.

- Carbon dioxide is non-frammable, thus used in fire extinguishers as it displaces oxygen. ✓ any two
- Has high density thus useful in refrigeration ✓
- Highly reactive with water to form Carbonic acid that is useful in PH control. ✓
- Low toxicity thus safe for human consumption in beverages ✓

02

(c) calculate the volume of the gaseous product measured at *s.t.p*, that was formed.

$CaCO_3(s) \longrightarrow CaO(s) + CO_2(g)$

Molar mass of $CaCO_3$ = 100g ✓

Mass of $CaCO_3$ = 25g

Molar mass of CO_2 = 44g ✓

100g of $CaCO_3$ formed 44g of CO_2

25g of $CaCO_3$ formed $\left(\frac{44 \times 25}{100}\right)$g of CO_2

= 11g of CO_2 ✓

44g of CO_2 occupies 22.4L ✓

11g of CO_2 occupies $\left(\frac{22.4 \times 11}{44}\right)$L ✓

= 5.6 Litres at S.T.P ✓

03

(d) explain the impact of one of the products on the environment.

any one

Calcium oxide;

It neutralizes the soil as it increases the soil PH ✓

Once in contact with water, it removes impurities and softens it. ✓

01