END OF TERM TWO EXAMINATIONS

Uganda Advanced Certificate of Lower Education

S5 CHEMISTRY

Paper 1

TIME: 2 HOURS 30 MINUTES

INSTRUCTIONS

This paper consists of two sections A and B

Answer all questions in both sections in section A and B, all answers to section A must be written in the spaces provided and a very clean provided answer sheet for section B answers

Where necessary take C=12, O=16,H=1, 1Mole of a gas occupies a volume of 22.4dm^3 at stp

SECTION A(40 marks)

June 2025 Israel launched a missile attack targeting a heavy nuclear plant that plays a vital role in Iranian government especially acting as there only source of nuclear energy and electricity which involves splitting of unstable nuclei such as uranium according to the equation below

Equation

$$^{235}_{92}U + {}^{1}_{0}n \longrightarrow {}^{141}_{56}Ba + {}^{92}_{36}Kr + 3{}^{1}_{0}n + \text{energy}$$

The international nuclear agencies of Iran are concerned with the consequences of the plant to the people in that area if it explodes ,U have been chosen to attend the workshop as a senior nuclear operator(NRO) to enlighten the reporters on the operation of the plant.

Task

a)Explain

i)The category of the process involved in the plant

……
……
……
……

ii)how the process is used in the production of electricity

……
……
……
……
……
……
……
……
……
……
……
……
……

b)Advice them on the challenges associated with a long term use of the process and how it can be mitigated

……
……
……
……
……
……

c)they also came across a radium atom that undergoes radioactivity according to the equation below

$$^{226}_{88}Ra \xrightarrow{\beta} X \xrightarrow{\alpha} Y \xrightarrow{\alpha} Z$$

i)Help them identify the particles X,Y and Z

- X……
- Y……
- Z……

ii)if 0.02 moles of radium were allowed to decay for 2.4×10^4 years . The half life of radium is 1600 years.

Calculate the number of atoms of radium left at the end of 2.4×10^4 years.

Avogadro's constant $= 6.02 \times 10^{23}$ atoms per mole

……
……

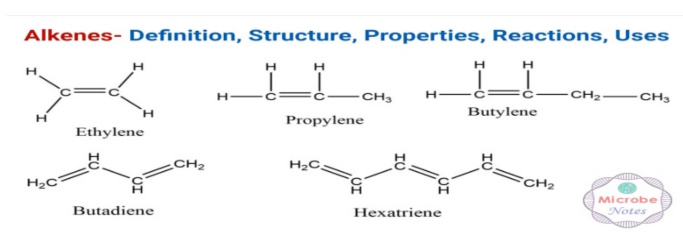
………
………
………
………
………
………
………
………

d)compare the processes involved in the nuclear power production , state any two applications of nuclear reactions.

………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………

ITEM 2

Your school science club is exploring alternative fuel projects. During a project , you are given samples of hydrocarbons including alkanes, alkenes and alcohols. To analyse their properties and potentials fuels. The teacher asks you to identify the functional groups and names of each compound using IUPAC rules.



BY TENYWA JAYDEN

You notice that one sample with a formular ; C_6H_{10} denoted as W, has various isomers . You must create models to represent the isomers and differences in their properties and structure.

Task

a)identify the functional groups in each category of homologous series identified above

alkanes……
alkenes……
alcohols……..

b)write down the possible isomers ,names and structural formulae of the possible isomers of the identified molecular formular above

……
……
……
……
……
……
……
……
……
……
……
……
……
……

c)W undergoes ozonolysis to form similar compounds ,

i) identify W

……

ii)write an equation to show how W can be ozonolysed

……
……
……

d)help the science club to synthesise the following

i) CaO to ethyne

……
……
……
……
……

ii)$CH_3CH_2CH_2CH_3$ from ethene

……
……
……
……
……

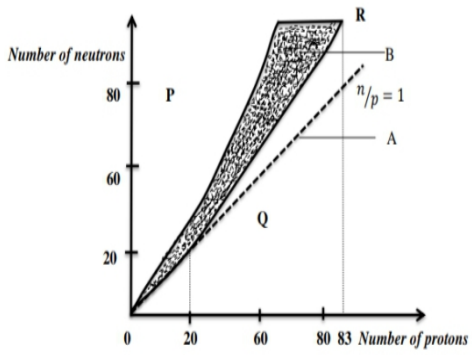
iii)ethanol to ethyne

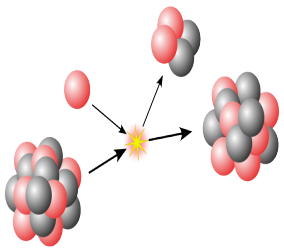
……
……
……
……
……

SECTION B(40 marks)

ITEM 3

Seniour 4 learners at Nakaloke secondary school came across a news paper which addressed concerns on nuclear reactions that must be considered during amendments on nuclear plant installment in Buyende district . On further analysis on reading, they came across a related curve relating the neutrons and protons as shown below



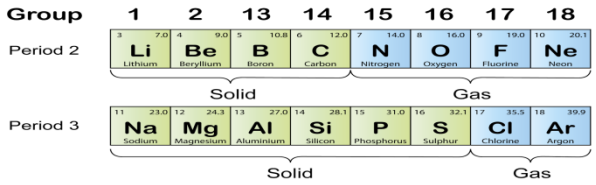


Task

As an advanced learner of chemistry, with reference to the above graph, write a report addressing to the desperate learners over which the graph is all about, factors responsible for the variations in different regions P, Q and R, how the different nuclei in the regions above vary and attain there stability. Elaborate thorouhgly the meaning of nuclear stability. **20Marks**

ITEM 4

In a university chemistry facility a new delivery of elementary facility samples arrives but some of the labels are not meeting students certainity. The only visible information includes atomic numbers of period 3 and period 2similar to the figure below. They are also eager to know period 3 elements vary in various properties



Task.

As a student of chemistry , write a report addressing the electronic configurations of the period 3 elements, how the elements react with water and air .(using equations is a must, oooh ooooooh
20 marks

By MOKO CHARLES- CHEMISTRY DEPARTMENT