**BENZENE HIGH SCHOOL, KIBOGA**

UGANDA ADVANCED CERTIFICATE OF EDUCATION

END OF TERM I EXAMINATIONS 2024

**S.5 CHEMISTRY PAPER 2**

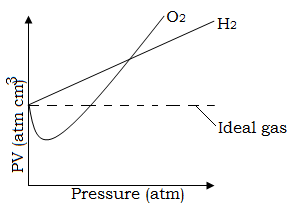
2 Hours 30 Minutes

**INSTRUCTIONS TO LEARNERS**

* *This paper consists of* **two** *sections A and B.*
* *Answer only* ***three*** *questions from section A and only* ***two*** *from section B.*
* *Any additional question(s) answered will* **not** *be marked.*
* *All working must be shown clearly. Begin each question on a fresh sheet of paper.*
* *Number your work correctly.*

**SECTION A**

1. (a) State what is meant by ideal gas. (01 mark)
2. Explain how liquefication of a gas can be affected by;
3. Pressure ()
4. Temperature ()
5. The curve below shows deviations of some gases from ideal behaviour.



1. State why hydrogen shows a small deviation from ideal behavior compared to the other gases. ()
2. Compare the deviations of oxygen and carbon dioxide from ideal behavior. ()
3. A gas Q contains 30.43% nitrogen and the rest being oxygen. 0.23g of Q occupied 154.11 cm3 at 150 and 840 mmHg. Determine the;
4. Empirical formula of Q. (2 marks)
5. Molecular formula of Q. ()
6. When a mixture of Q and oxygen was bubbled through water, a compound Y was formed.
7. Identify Y. ()
8. Write san equation for the reaction leading to the formation of Y. ()
9. Briefly describe a test that can be carried out to identify the anion in Y. ()
10. (a) Define the term isotopes. (1 mark)
11. Describe the main stapes involved in the operation of a mass spectrometer. (Diagram not required). (05 marks)
12. The table below shows the information from the mass spectrum sample.

|  |  |
| --- | --- |
| Isotope | Detector, current (m/A) |
| 204 | 0.16 |
| 206 | 2.72 |
| 207 | 2.50 |
| 208 | 5.92 |

Calculate the;

1. Relative abundance of the different isotopes of lead in the sample. (05 marks)
2. Relative atomic mass of lead. (03 marks)
3. State two disadvantages of using mass spectrometer over the depression of freezing point method in determining the relative atomic masses. (02 marks)
4. The initial count of a radioactive nucleus was 680g per count per second. After 350 seconds, the count rate was 125 per count.

Calculate the;

1. Decay constant. (02 marks)
2. Half-life of the nucleus. (02 marks)
3. Complete the following equations and write the accepted mechanism for each of the reactions.
4. (04 marks)
5. (04 marks)
6. (02 marks)
7. (02 marks)
8. (04 marks)
9. (04 marks)
10. The elements beryllium, magnesium and barium belong to group(II) in the periodic table.
11. (i) State three chemical properties shown by the elements. For each property write an equation to illustrate your answer. (06 marks)
12. Explain the trends in the solubilities of the hydroxides of the elements in water.(2)
13. Beryllium differs in some of its properties from the rest of the members of the group.
14. State two properties in which beryllium differs in some of its properties from the rest of the members of the group. (02 marks)
15. Give reasons why beryllium shows different properties from the rest of the elements. (02 marks)
16. Beryllium shows some similarities with aluminium.
17. State three properties in which beryllium shows similarity to aluminium. (03 mrks)
18. Give two reasons why beryllium shows similarity to aluminium. (02 marks)
19. (i) Name one reagent that can be used to distinguish between magnesium ions and barium ions. (01 mark)
20. State what would be observed in each case when the reagent in (i) above was used. (02 marks)

**SECTION B**

1. The atomic numbers and melting points of some elements in period 3 of the periodic table are shown below.
2. (i) Plot a graph of melting points against atomic number. (03 marks)
3. Explain the shape of the graph in (i). (06 marks)
4. Describe and explain how the oxides of magnesium, aluminium and silicon react with;
5. Sodium hydroxide
6. Hydrochloric acid. (09 marks)
7. State the nature of the oxides of aluminium, phosphorous and sodium. (02 marks)
8. (a) Define the term isomerism. (01 mark)

(b) Discuss using examples the different types of isomerism. (09 marks)

(c) Distinguish between the following;

(i) Nucleophile and electrophile. (02 marks)

(ii) Substituition and elimination reactions. (02 marks)

1. Discuss the trend in the stability of carbonium ions. (06 marks)
2. (a) State Dalton’s law of partial pressure. (01 mark)

(b) Define mole fraction. (01 mark)

(c) At a constant temperature, a vessel contains two gases A and B. the pressure of A is atmosphere and its mole fraction is 0.7. Calculate;

1. The partial pressure of B. (03 marks)
2. The total pressure exerted by a mixture of the gases. (02 marks)
3. 2.20g of carbon dioxide occupies 1166 cm3 at 15 and 12700 Pa pressure. Calculate the value of the gas constant R in (03 marks)
4. (i) Define the term critical temperature. (01 mark)
5. Explain the factors which affect the liquefaction of a gas. (09 marks)

**END**