

**AGA KHAN UNIVERSITY EXAMINATION BOARD**

**SECONDARY SCHOOL CERTIFICATE**

**CLASS IX**

**ANNUAL EXAMINATIONS (THEORY) 2023**

**Chemistry Paper II**

**Time: 1 hour 50 minutes Marks: 25**

**INSTRUCTIONS**

**Please read the following instructions carefully.**

1. Check your name and school information. Sign if it is accurate.

**I agree that this is my name and school.  
Candidate's Signature**

**RUBRIC**

2. There are SIX questions. Answer ALL questions. Questions 5 & 6 each offer TWO choices. Attempt any ONE choice from each.
3. When answering the questions:

Read each question carefully.

Use a black pointer to write your answers. DO NOT write your answers in pencil.

Use a black pencil for diagrams. DO NOT use coloured pencils.

DO NOT use staples, paper clips, glue, correcting fluid or ink erasers.

Complete your answer in the allocated space only. DO NOT write outside the answer box.

4. The marks for the questions are shown in brackets ( ).
5. You may use a simple calculator if you wish.

Q.1. (Total 3 Marks)

Draw the structure of an ion with the following features.

- Charge of -3
- Atomic number = 15
- Nucleon number = 31

**Space for drawing**

Q.2. (Total 3 Marks)

Complete the following blanks with reference to the physical properties of labelled elements.

F	
Cl	Odour = _____
Br	Physical State at Room Temperature = _____
I	Colour = _____
At	

Q.3.

(Total 3 Marks)

When ammonium chloride ( $\text{NH}_4\text{Cl}$ ) is heated in a test tube, it results in the formation of ammonia ( $\text{NH}_3$ ) and hydrogen chloride ( $\text{HCl}$ ) gases. The fumes of the gases can be observed moving along the test tube.

(Note: Atomic mass of N = 14 amu, H = 1 amu and Cl = 35.5 amu)

- a. Name the process that allows the movement of gases along the test tube.

(1 Mark)

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- b. Which gas, ammonia or hydrogen chloride, will travel at a faster speed? Give a suitable reason to support your answer.

(2 Marks)

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Q.4.

(Total 4 Marks)

When a piece of Mg ribbon is lit, it burns with a dazzling white light. The combination of Mg with oxygen produces a white substance.

- a. Identify the element that has the symbol Mg.

(1 Mark)

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- b. Write a balanced chemical equation to show the given chemical reaction.

(2 Marks)

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- c. Which type of bond is formed in the product of this reaction?

(1 Mark)

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Q.5.

(Total 6 Marks)

**EITHER**

- a. An experiment shows that a compound **Y** contains 80% carbon and 20% hydrogen by mass. If the relative molecular mass of this compound is 30.07 g/mol, then
- calculate the empirical formula of the compound **Y**. (3 Marks)
  - determine its molecular formula. (3 Marks)

(Note: Atomic mass of C = 12 amu and H = 1 amu)

**OR**

- b. You have a solution of copper(II) sulphate in water. You want to obtain solid copper(II) sulphate from it.
- Describe why the technique of filtering copper(II) sulphate solution will not work. (1 Mark)
  - Which method will you use instead? Give a reason to support your answer. (2 Marks)
  - Describe how you will obtain solid copper(II) sulphate in THREE steps using the method identified in part ii. (3 Marks)

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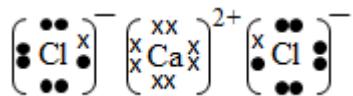
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Q.6.

(Total 6 Marks)

**EITHER**

- a. Consider the given dot and cross structure of a compound.



(2,8,8) (2,8,8) (2,8,8)

With reference to the given dot and cross structure,

- i. identify the type of bond that exists in it. (1 Mark)
- ii. describe the role of each atom in the formation of the bond identified in part i. (2 Marks)
- iii. write any THREE general characteristics of such type of compounds. (3 Marks)

**OR**

b.

- i. Define the term, 'electrolysis'. (1 Mark)
- ii. Describe the electrolysis of concentrated sodium chloride solution (brine). Support your answer by writing chemical equations for reactions occurring at the cathode and the anode of the electrolytic cell. (5 Marks)

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