

City International School

ANNUAL EXAMINATION 2015 – 2016

Date : 14/03/2016

Std : IX

Subject : Chemistry (Paper 2)

Marks : 80

Time : 2 hrs

Answer to this question must be written on the paper provided separately.

You will not be allowed to write during the first 15 minutes.

This time is spent in reading the question paper.

The time at the head of this paper is the time allowed for writing the answers.

Attempt all questions from SECTION A and **four** questions from SECTION B.

The intended marks for questions or parts of questions are given in the bracket. ()

SECTION – A [40 MARKS]

Attempt all questions from this section.

Question 1

- a. Select from the list the gas that matches the description given in each case. (5)

Each answer must be used only once.

[Ammonia, Hydrogen sulphide, Hydrogen chloride, Sulphur dioxide, Nitrogen, Chlorine]

- This gas burns in oxygen with a green flame.
- This gas has a characteristic rotten egg smell.
- This gas is obtained on heating ammonium nitrite.
- This gas produces dense white fumes with ammonium gas.
- This gas is evolved when conc. hydrogen chloride is oxidized.

- b. Define (any 2) (2)

- Ionisation Potential
- Electrovalent bond
- Electron Affinity

- c. Explain

- The oxidizing power of elements increases from left to right along a period. (2)
- Hydrogen chloride can be termed as a polar covalent compound. (3)

- d. Write the chemical name of the following compounds. (5)

- K_2HgI_4
- $NOCl$
- $Na_2S_2O_3$
- $[Ag(NH_3)_2]Cl$
- $NaHSO_3$

- e. State the difference between ionic and covalent compound based on its – (2)

- Volatility
- Melting and Boiling point

- f. Give balanced chemical equations for each of the following (3)

- Lab preparation of ammonia using an ammonium salt.
- Reaction of ammonia gas with excess chlorine.
- Reaction of ammonia gas with sulphuric acid.

- g. Choose the most appropriate answer for each of the following. (6)
- Identify the covalent compound which forms triple bond
A. Oxygen B. Chlorine C. Nitrogen D. Hydrogen
 - In the fountain experiment of ammonia.
A. Blue litmus solution forms blue fountain
B. Red litmus solution forms blue fountain
C. Blue litmus solution forms red fountain
D. Red litmus solution forms red fountain
 - Identify the statement which does not describe the property of hydrogen chloride gas
A. It fumes in moist air B. It undergoes combustion
C. It decolorizes methyl orange to pink D. It is highly soluble in water
 - Bonding in this molecule can be understood to involve coordinate bonding.
A. Carbon tetrachloride B. Hydrogen
C. Hydrogen chloride D. Ammonium chloride
 - The group of element X if its atomic number is 16
A. VI A C. IV A
B. VI B D. IV B
 - Among the elements given below, which one has high electron affinity.
A. Lithium C. Neon
B. Carbon D. Fluorine
- h. Give appropriate reasons for the following statements. (5)
- Quick lime is used as drying agent during the preparation of ammonia.
 - Aqua regia dissolves noble gases which are insoluble in all other gases.
 - Ammonium nitrate is not used in the preparation of ammonia.
 - Covalent compounds exist as gases, liquids and soft solids.
 - Hydrochloric acid is used for the extraction of glue from bones.
- i. Name the first and the last element in period 3 (2)
- j. Give balanced chemical equations for the following reactions. (5)
- Calcium bicarbonate with dil. hydrochloric acid
 - Red lead with conc. hydrochloric acid
 - Aluminium nitride with water
 - Reducing nature of ammonia with metallic oxide
 - Ammonia with conc. hydrochloric acid

SECTION – B [40 MARKS]

Attempt any four questions from this section.

Question 2

- a. Arrange the following as per the instructions given in the brackets (4)
- Rb, Na, Cs, K (increasing order of Ionisation Potential)
 - Al, Si, Na, Mg (decreasing order of Electropositive character)
 - Br, Cl, I, F (increasing order of Electron Affinity)
 - Li, F, C, O (decreasing order of nuclear charge)
- b. The following questions are pertaining to the laboratory preparation of hydrogen chloride gas
- Write the equation for its preparation mentioning the condition required. (1)
 - Name the drying agent used and justify your choice. (2)
 - State a safety precaution you would take during the preparation of hydrochloric acid. (1)
- c. Explain – External heating is not required in Haber’s process. (2)

Question 3

- a. Refer to the information below and give complete balanced equations for the following reactions (write conditions if any). (5)
- | | | |
|---------------------------------------|--------------------------|------------------|
| Sal ammoniac + slaked lime | $\xrightarrow{\text{A}}$ | Ammonia |
| Ammonia + <u>B</u> | \longrightarrow | Liquor ammonia |
| Liquor ammonia + <u>C</u> | \longrightarrow | Copper hydroxide |
| Copper hydroxide + Ammonium hydroxide | \longrightarrow | <u>D</u> |
- b. Draw the structural formula of carbon tetrachloride and state the type of bond present in it. (2)
- c. We can distinguish between dil. HCl and dil. HNO₃ by adding only one solution. Name it. (1)
- d. How is ammonia collected? Why is ammonia not collected over water? (2)

Question 4

- a. A boy dreamt about few elements of the Periodic Table. Try to solve his query based on the given list – Li, Be, B, C, O, F, Ne (6)
- To which period do these elements belong?
 - Which is the missing element and where should it be placed?
 - Which of the above element has the electronic configuration {2,6}?
 - Which of the above element has the highest Ionisation Potential?
 - Which of the above element belongs to the halogen series?

- b. Show the formation of water molecule using an electron “dot and cross” diagram. (2)
State the type of bond present in it.
- c. State as oxidation or reduction reaction (any 2). (2)
- $\text{Cu}^{2+} + 2\text{e}^- \longrightarrow \text{Cu}$
 - $\text{K} - \text{e}^- \longrightarrow \text{K}^+$
 - $\text{Fe}^{2+} - 1\text{e}^- \longrightarrow \text{Fe}^{3+}$

Question 5

- a. Show the lone pair effect leading to the formation of an ammonium ion and hydroxyl ion from ammonia gas with the help of electron dot diagram. (2)
- b. Choose the most appropriate answer from the following list. Each answer may be used only once. [increases, ionic, decreases, covalent, metallic] (4)
- Compound generally insoluble in water.
 - Electro negativity across the period.
 - Element with low ionization potential.
 - Compound formed by sharing electron.
- c. Compare sodium chloride and methane with regard to their solubility in water and state the reason to support your answer. (2)
- d. Elements E, F, G have atomic numbers 19, 20, 8 respectively. (2)
Give the formula of the compound formed between F and G. State the type of chemical bond in this compound.

Question 6

- a. Explain the bonding in sodium chloride molecule using atomic (orbital) structural diagram. (2)
- b. A metal in period 3, group 1 in the periodic table. (1)
- c. Complete and balance the following chemical reactions. (4)
- $\text{KMnO}_4 + \text{HCl (conc.)} \longrightarrow$
 - $\text{AgNO}_3 + \text{HCl (dil.)} \longrightarrow$
 - $\text{ZnSO}_4 + \text{NH}_4\text{OH} \longrightarrow$
 - $\text{Mg}_3\text{N}_2 + \text{H}_2\text{O} \longrightarrow$

- d. A group of elements in the periodic table are given – Boron, Aluminum, Indium, Thallium. (2)
[Boron being the first member and Thallium the last member of the group].
- The atomic number of aluminum is 17. Write the chemical formula of the compound formed when aluminum reacts with chlorine.
 - Will the elements in the group to the right of boron be more metallic or less metallic in character? Justify your answer?
- e. Justify the use of funnel arrangement during the preparation of hydrochloric acid. (1)

Question 7

- a. Define : i. Covalency ii. Aqua regia (2)
- b. Represent the formation of magnesium chloride with the help of electron dot structure. Mention the type of bond thus formed (2)
- c. Differentiate between alkali metals and halogen on the bases of their: (2)
- Valency
 - Conductivity
- d. State the colour of the precipitate and the solubility of the precipitate in excess (4)
of NH_4OH when the following metallic salt solution reacts with ammonium hydroxide
- $\text{Pb}(\text{NO}_3)_2$
 - ZnSO_4