

# ***City International School***

## **FIRST TERMINAL EXAMINATION – 2015 - 2016**

**Date : 05/08/2015**

**Marks : 80**

**Std : X**

**Subject : Chemistry (Paper II)**

**Time : 2hrs**

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

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

This time is to be spent in reading the question paper.

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

Section I is compulsory. Attempt any four questions from section II.

The intended marks for questions or parts of questions are given in brackets ( )

### **SECTION I [40 MARKS]**

**Attempt all questions from this section.**

#### **Question 1**

a. Choose the correct answer from the options given below. **(10)**

i. Down a group, the no. of valence electrons:

1. Remains the same      2. Increases      3. Decreases

ii. A molecule of 'X' contains a triple bond, therefore 'X' is:

1. Hydrogen      2. Ammonia      3. Nitrogen

iii. An acid which is present in baking powder:

1. Hydrochloric acid      2. Acetic acid      3. Tartaric acid

iv. The salt which will not react with  $\text{NH}_4\text{OH}$  solution is:

1.  $\text{ZnCl}_2$       2.  $\text{NH}_4\text{Cl}$       3.  $\text{CuSO}_4$

v. The gas law which relates the volume of a gas to the number of molecules of the gas is:

1. Avogadro's law      2. Gay – Lussac's law      3. Charles's law

vi. An aqueous solution of  $\text{HCl}$  gas is named as:

1. Aqua fortis      2. Muriatic acid      3. Oil of vitriol

vii. Ammonium chloride is a soluble salt prepared by:

1. Precipitation      2. Neutralization      3. Dissociation

viii. Metals lose electrons during ionization – this change is called –

1. Oxidation      2. Reduction      3. Displacement

ix. Across a period, the ionization potential:

1. Increases      2. Decreases      3. Remains same

x. A complex salt is:

1. Zinc sulphate      2. Sodium zincate  
3. Ferrous ammonium sulphate

- b. Give one word or phrase for the following: (5)
- The tendency of an atom to attract electrons to itself when combined in a compound.
  - A type of bonding which involves one of the combining atoms contributing both of the shared electrons.
  - The amount of water molecules which enter into loose chemical combination with one molecule of the substance (salt) on crystallization from its aqueous solution.
  - The no. of atoms present in – one molecule of that element.
  - The chemicals which like liquefied ammonia gas are used as refrigeration gas.
- c. State your observation in each of the following cases. (5)
- Lead nitrate solution and sodium chloride solution are mixed.
  - Ammonium hydroxide is added in excess to a solution of Iron (II) hydroxide.
  - A few drops of dil HCl are added to  $\text{AgNO}_3$  solution, followed by addition of  $\text{NH}_4\text{OH}$  solution.
  - Excess of chlorine gas is reacted with  $\text{NH}_3$  gas.
  - When a gas jar containing hydrogen chloride gas is inverted over a jar full of  $\text{NH}_3$  gas.
- d. Give reasons. (5)
- Alkali metals are good reducing agents.
  - Carbon tetrachloride which is a liquid, is a non – electrolyte.
  - Direct addition of dil.  $\text{H}_2\text{SO}_4$  to  $\text{PbCO}_3$  is an impractical method of preparing lead sulphate.
  - Ammonia is not obtained in the laboratory from  $\text{NH}_4\text{NO}_3$ .
  - Hydrogen chloride gas cannot be dried over quick lime.
- e. Give balanced chemical equations for the following. (5)
- Excess sodium hydroxide combine with sulphuric acid to form salt and water.
  - Magnesium chloride combine with ammonium hydroxide to give insoluble ppt.
  - Action of heat on a mixture of manganese dioxide and conc. hydrochloric acid.
  - Burning of ammonia in oxygen.
  - Reaction of hydrogen chloride gas on Zinc metal.
- f. Identify the following. (5)
- A promoter which is used in Haber's process.
  - A gas which is liberated when Potassium permanganate combined with conc. Hydrochloric acid.
  - The gas evolved on reaction of aluminium with boiling conc. Caustic alkali solution.
  - A base which is used as an antacid.
  - A compound which has all the three bonds i.e. ionic, covalent and coordinate bond.

- Calculate:

i. The mass of copper needed to react with 126g of  $\text{HNO}_3$ .

ii. Vol. of nitric oxide obtained at the same time.

(Cu = 64, H = 1, O = 16, N = 14)      Write the balanced chemical equation also.

**Attempt any four questions from this section.**

- a. A group of elements in the Periodic table are given – Boron, Aluminium, Gallium, Indium, Thallium. (Boron is the first member of the group and Thallium is the last.) Answer the following questions in relation to the above group of elements. (5)

j. Which element has the most metallic character?

ii. Which element would be expected to have the highest electro – negativity?

iii. If the electronic configuration of Aluminium is 2, 8, 3, how many electrons are there in the valence shell of Thallium?

iv. The at no. of Boron is 5. Write the formula of the compound formed when boron react with chlorine.

v. Will the elements in the group to the right of this Boron group be more metallic or less metallic in character? Justify.

- b. Sodium hydroxide solution is added to the solutions containing the ions mentioned in list 1, match these ions with their coloured precipitates in list 2. (5)

List 1 –      i.       $\text{Pb}^{+2}$                       ii.       $\text{Fe}^{+3}$                       iii.       $\text{Cu}^{+2}$   
                 iv.       $\text{Fe}^{+2}$                       v.       $\text{Zn}^{+2}$

List 2 –

A.	Reddish brown	B.	Chalky white, soluble in excess
C.	Dirty green	D.	Gelatinous white, soluble in excess
E.	Pale blue		

- a. Choose the property which is characteristic of an electrovalent compound: **(1)**
- i. It is easily vaporized.                      ii. It is a strong electrolyte.
- iii. It has a low melting point.

- i. It is easily vaporized.

ii. It is a strong electrolyte.

- iii. It has a low melting point.

- b. Explain with the help of
- An ionic equation
  - Electron dot structural diagram, the formation of the Magnesium chloride.
- (4)**

ii. Electron dot structural diagram, the formation of the Magnesium chloride.

- c. Mention the colour changes observed when the following indicators are added to acids: (3)

to acids:

i. Methyl orange solution

ii. Neutral litmus solution

ii. Alkaline phenolphthalein solution.

- d. Give balanced chemical equations for formation of nitric acid in acid rain. (2)

#### Question 4

- a. i. State Avogadro's law. (1)
- ii. A cylinder contains 68g of ammonia gas at s.t.p. (3)
1. What is the volume occupied by this gas?
  2. How many moles of ammonia are present in the cylinder?
  3. How many molecules of ammonia are present in the cylinder?  
(N = 14, H = 1)
- b. Explain the following chemical reaction with relevant observations and balanced chemical equations. (4)
- Ammonium hydroxide solution is added to copper (II) nitrate solution in small quantities and then in excess.
- c. What volume of oxygen is required to burn completely 90dm<sup>3</sup> of butane under similar conditions of temperature and pressure. (2)
- $$(2\text{C}_4\text{H}_{10} + 13\text{O}_2 \longrightarrow 8\text{CO}_2 + 10\text{H}_2\text{O})$$

#### Question 5

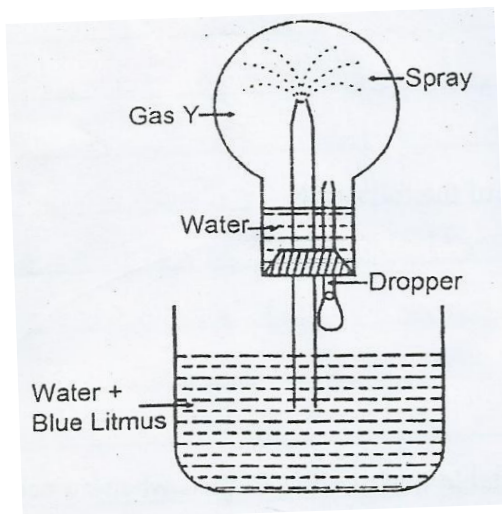
- a. A compound 'X' consists of 4.8% carbon and 95.2% bromine by mass. (4)
1. Determine the empirical formula of this compound working correct to one decimal place.
  2. If the vapour density of the compound is 252, what is the molecular formula of the compound?
- b. Which of the methods, A, B, C, D or E is generally used for preparing the chlorides listed below from (i) to (v). (5)
- A. Action of an acid on a metal.
- B. Action of an acid on an oxide or carbonate.
- C. Direct combination.
- D. Neutralization of an alkali by an acid.
- E. Precipitation (double decomposition)
- i. Copper (II) chloride.
  - ii. Iron (II) chloride.
  - iii. Iron (III) chloride.
  - iv. Lead (II) chloride.
  - v. Sodium chloride.
- (Each method is to be used only once.)
- c. Define – 'Efflorescence'. (1)

### Question 6

- a. i. Give the balanced chemical equation of the Haber's Process (Manufacture of ammonia) (5)
- ii. State the precaution taken for the reaction.
- iii. Mention the following conditions.
1. Temperature      2. Pressure      3. Catalyst
- b. Draw the Atomic structural diagram of carbon tetrachloride and state the type of bond present in it. (4)
- c. Why do covalent compounds exist as gases, liquids or soft solids? (1)

### Question 7

- a. With reference to period 3 of the periodic table state: (5)
- i. The type of bonding of the element with electronic configuration 2, 8, 7.
- ii. The formula of the chloride of the element with electronic configuration 2, 8, 4.
- iii. The nature of oxide of the alkaline earth metal in the period.
- iv. The number of electrons in penultimate shell of the element with valency 1.
- v. The electronic configuration of the element whose hydroxide is a weak base.
- b. State group and period, of the element having 3 shells with 3 electrons in valence shell. (2)
- c. Study the figure given below and answer the questions that follow: (3)



- i. Identify the gas Y.
- ii. What property of gas Y does this experiment demonstrate?
- iii. Name another gas which has the same property and can be demonstrated through this experiment.