LOYOLA SCHOOL, BHUBANESWAR

Half-Yearly Evaluation, September 2025

Class: X **Subject: Chemistry (Science Paper – 2)** **F.M. = 80** **Time: 2 Hrs.**

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 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 **[15]**

Choose the correct option for the following.

(i) Which pair of compounds could not be used in the preparation of ammonia?
   a. N_2 and H_2
   b. $Ca(OH)_2$ and $(NH_4)_2SO_4$
   c. $Ca(OH)_2$ and $(NH_4)_2CO_3$
   d. $Ca(OH)_2$ and $(NH_4)_2NO_3$

(ii) Electrolytes conduct electricity due to the:
   a. migration of electrons
   b. migration of cations towards cathode only
   c. migration of anions towards anode only
   d. migration of cations and anions towards cathode and anode respectively.

(iii) An element in period 3 whose electron affinity is zero.
   a. Neon
   b. Sulphur
   c. Sodium
   d. Argon

(iv) Ionisation potential increases over a period from left to right because the :
   a. Atomic radius increases and nuclear charge increases
   b. Atomic radius decreases and nuclear charge decreases
   c. Atomic radius increases and nuclear charge decreases
   d. Atomic radius decreases and nuclear charge increases

(v) The hydroxide of this metal is soluble in excess of sodium hydroxide solution:
   a. Lead
   b. Magnesium
   c. Copper
   d. Iron

(vi) The number of hydroxyl ions that one molecule of a base gives on dissociation in water:
   a. Acidity
   b. Basicity
   c. Neutral
   d. None of these

(vii) The ratio of certain mass of a gas or vapour to the mass of same volume of hydrogen is its _____

a. Vapour density
b. Molecular formula
c. Empirical formula
d. Percentage composition

(viii) The correct order of Electron Affinity is –

a. I > Br > Cl > F
b. F> Cl > Br > I
c. Cl > F > Br > I
d. Cl>Br > F > I

(ix) Ammonium hydroxide and sodium hydroxide can be distinguished using:

a. Litmus paper
b. Hydrochloric acid
c. Copper sulphate solution
d. Zinc sulphate solution

(x) Vapour density of a compound is 30. Its empirical formula is CH_2O. The molecular formula of the compound is –

a. $C_2H_2O_4$
b. $C_4H_4O_8$
c. $C_2H_4O_2$
d. $C_5H_5O_{10}$

(xi) Why promoter is used in the Haber's process –

a. To increase the pressure
b. To decrease the rate of reaction
c. To decrease the temperature
d. To increase the efficiency of finely divided iron

(xii) Which of the following elements will form an acidic oxide?

a. An element with atomic number 19
b. An element with atomic number 3
c. An element with atomic number 12
d. An element with atomic number 7.

(xiii) The element with highest ionisation potential in the periodic table is –

a. Neon
b. Helium
c. Hydrogen
d. Sodium

(xiv) The salt which is insoluble in dilute nitric acid but soluble in excess of ammonium hydroxide is?

a. NH_4Cl
b. AgCl
c. $PbCl_2$
d. $FeCl_2$

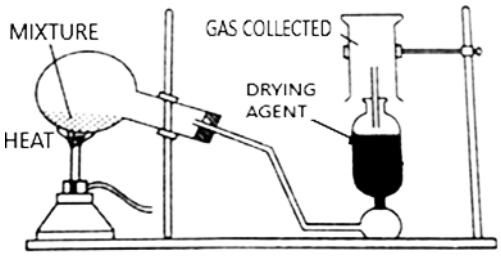
(xv) A salt prepared by neutralization in which titration is involved is _____

a. $CaCl_2$
b. $MgCl_2$
c. NH_4Cl
d. $CuCl_2$

Question 2

(i) The diagram shows an experimental set up for the laboratory preparation of a pungent smelling gas. The gas is alkaline in nature. **[5]**

(a) Name the reactants used.
(b) Why is the reacting flask kept inclined?
(c) Give balanced equation for the reaction.
(d) Name the drying agent used.
(e) State the method of collection of the gas.



(ii) Match the following Column A with Column B. **[5]**

Column A	Column B
(a) Basic salt	1. Soluble in excess sodium hydroxide
(b) Polar covalent compound	2. Pink
(c) Copper metal	3. Basic copper nitrate
(d) Chlorine gas	4. Water
(e) Lead hydroxide	5. Greenish yellow

(iii) Identify / state the following: **[5]**

(a) It is the amount of energy released when an atom in the gaseous state accepts an electron to form an anion.
(b) A process when an atom or ion loses electrons.
(c) Electrolytic process of deposition of a superior metal on the surface of a baser metal or article.
(d) A salt which is formed by incomplete neutralisation of a base by an acid.
(e) Industrial process for manufacture of ammonia.

(iv) Draw the electron dot structure for the following: **[5]**

(a) Hydronium ion
(b) Magnesium chloride
(c) Ammonium ion
(d) Calcium oxide
(e) Methane

(v) Complete the following by choosing the correct answer from the following: **[5]**

(a) If an element has seven electrons in its valence shell, then it is likely to have the _____ [largest / smallest] atomic size among all the elements in the same period.

(b) Ammonia in the liquefied form is _____ [basic / neutral]

(c) The substance reacted with conc. HCl and heated to prove that conc. HCl contains Cl_2 is _____

[$PbCl_2$ / PbO_2]

(d) The chemical compound present in zinc blende is _____

[Zinc carbonate / Zinc sulphide]

(e) The molecule of water combines with a _____

[hydrogen atom / proton] to form a hydronium ion.

SECTION II (40 marks)

Attempt any four questions from this section

Question 3.

(i) Name the gas evolved when: [2]

(a) Sodium bisulphite reacts with dilute hydrochloric acid.

(b) Warm water is added to calcium nitride.

(ii) How many covalent and coordinate bonds arepresent in: [2]

(a) Hydronium ion

(b) Ammonium ion

(iii) Arrange the following as per the instruction given in the bracket: [3]

(a) Al^{3+} , Cu^{2+} , Fe^{2+} , Ag^{+} (Increasing ease of reduction at the cathode)

(b) Na ,Cl ,Mg , P (Decreasing order of atomic size)

(c) Cl ,Al ,Na , S (Increasing order of ionisation potential)

(iv) A compound has the following percentage composition by mass: carbon 14.4%, hydrogen 1.2% and chlorine 84.5%. Determine the empirical formula of this compound. The relative molecular mass of this compound is 168, so what is its molecular formula? [C = 12, H = 1, Cl = 35.5] [3]

Question 4.

(i) Distinguish between the following as directed: [2]

(a) Zinc nitrate and lead nitrate using ammonium hydroxide

(b) Calcium carbonate and calcium sulphate using dilute hydrochloric acid and then suitable reagent.

(ii) Identify the substance underlined, in each of the following: [2]

(a) The <u>electrolyte</u> used for electroplating an article with silver.

(b) The <u>particles</u> present in a liquid such as kerosene that is a non-electrolyte.

(iii) Choose from the letters A, B, C and D to match the descriptions 1 to 3 given below: [3]

[A. NH_4Cl; B. AgCl; C.$PbCl_2$; D. $FeCl_2$]

(a) A salt which is insoluble in dilute nitric acid but soluble in ammonium hydroxide.

(b) A salt soluble in hot water but insoluble in cold water.

(c) A salt obtained on reaction of an active metal with hydrogen chloride gas.

(iv) Explain the following: [3]

(a) Electron affinity of neon is zero.

(b) Acetic acid is a monobasic acid.

(c) Electrolysis of acidulated water is considered to be an example of catalysis.

Question 5.

(i) What volume of oxygen is required to burn completely 90 dm^3 of butane under similar conditions of temperature and pressure? Also what volume of carbon dioxide is formed?

$2C_4H_{10} + 13\ O_2 \rightarrow 8CO_2 + 10H_2O$ [2]

(ii) Give balanced equation to obtain the following: [2]

(a) Sodium zincate from zinc

(b) Sodium aluminate from aluminium

(iii) Fill in the blanks by selecting the appropriate answer from the list in the bracket: [3]

(a) The cation discharged at the cathode most readily is _____. [Fe^{2+}, Cu^{2+}, H^{1+}]

(b) The metallic electrode which does not take part in an electrolytic reaction is _____. [Cu, Ag, Fe]

(c) A covalent compound which in aqueous state conducts electricity is _____. [CS_2, NH_3, CCl_4]

(iv) State the observation in each of the following: [3]

(a) Dry ammonia gas is passed over heated copper(II)oxide.

(b) Dilute hydrochloric acid is added to lead(II)nitrate solution and heated.

(c) Sodium hydroxide solution is added to Iron(III)chloride solution.

Question 6

(i) Name the probable cation based on the following observation: [2]

(a) Dirty green precipitate which is insoluble in excess of ammonium hydroxide.

(b) Pale blue precipitate which dissolves in excess of ammonium hydroxide.

(ii) Define: [2]

(a) Electronegativity

(b) Electroplating

(iii) Calculate the following: [all measurements are at s.t.p. or as stated in the problem] [3]

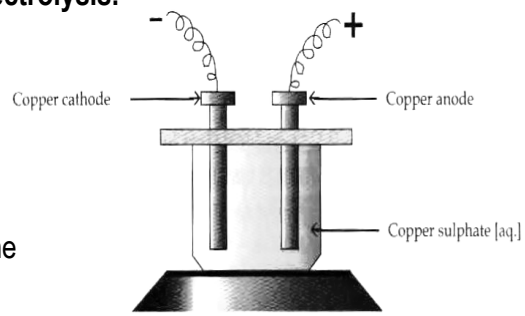
(a) The mass of 2.8 litres of CO_2 [C = 12, O = 16]

(b) The number of hydrogen atoms in 0.25 moles of H_2SO_4. [H = 1, S = 32, O = 16]

(c) The number of moles of P atoms in 93 g of P. [P = 31]

(iv) The figure given illustrates the apparatus used in the electrolysis of copper sulphate using copper electrodes. [3]

Answer the following questions related to the electrolysis.



Electrolysis of aqueous copper sulphate

(a) Why is the electrolyte acidified with traces of dilute sulphuric acid?
(b) Write the electrode reaction at cathode.
(c) If the electrodes are replaced by platinum, why does the blue colour of the electrolyte fades away?.

Question 7

(i) Give reasons: [2]
(a) An aqueous solution of HCl conducts electricity but not its gaseous state.
(b) Conc. H_2SO_4 is a good drying agent, yet it is not used to dry ammonia.

(ii) Give balanced equation for the following reactions: [2]
(a) When excess ammonia reacts with chlorine.
(b) When dilute hydrochloric acid reacts with iron.

(iii) The following reactions are carried out: [3]
A: Nitrogen + metal $\rightarrow$ Compound X.
B: X + Water $\rightarrow$ Ammonia + another compound
C: Ammonia + metal oxide $\rightarrow$ metal + water + N_2
(a) Write the formula of the compound X formed.
(b) Write balanced equation for reaction B.
(c) What property of ammonia is demonstrated by reaction C?

(iv) Identify the reactants P, Q and R in the following reactions: [3]
(a) Copper oxide + P $\rightarrow$Copper + Water
(b) Iron pyrite +Q $\rightarrow$Iron oxide + Sulphur dioxide
(c) Sodium chloride +R $\rightarrow$ Sodium nitrate +Silver chloride

**********ALL THE BEST**********