



Es. J. 1861

# BOYS' HIGH SCHOOL AND COLLEGE

PRELIMINARY EXAMINATION (2023-24)

CLASS - X  
CHEMISTRY

(Two hours)

Section A is compulsory. Attempt **any four** questions from Section II. The intended marks for questions or parts of questions are given in brackets [ ].

## SECTION - A (40 Marks)

Attempt **all** questions from this section

### Question 1

Choose **one** correct answer to the questions given from the given options:

[15]

(i) A property that does not match with the elements of the halogen family:

- (a) They have seven electrons in their valence shell
- (b) They are highly reactive chemically
- (c) They are metallic in nature
- (d) They are diatomic in their molecular form

(ii) The formation of 1,2 – dibromoethane from ethene and bromine is an example of:

- (a) substitution
- (b) dehydration
- (c) dehydrohalogenation
- (d) addition

(iii) Electronegativity increases across 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

(iv) This compound has all the three bonds (ionic, covalent and coordinate):

- (a) Ammonia
- (b) Ammonium chloride
- (c) Sodium hydroxide
- (d) Calcium chloride

(v) When fused lead bromide is electrolysed, we observe:

- (a) a silver grey deposit at anode and a reddish brown deposit at cathode
- (b) a silver grey deposit at cathode and a reddish brown deposit at anode
- (c) a silver grey deposit at cathode and reddish brown fumes at anode
- (d) silver grey fumes at anode and reddish brown fumes at cathode

(vi) The molecular formula of pentane is  $C_5H_{12}$ . It has

- (a) 5 covalent bonds
- (b) 12 covalent bonds
- (c) 16 covalent bonds
- (d) 17 covalent bonds

(vii) If a solution contains molecules as well as ions of a solute, it is a

- (a) weak acid
- (b) strong acid
- (c) strong base
- (d) salt solution

(viii) In the first step of Ostwald process, the gaseous reactants are:

- (a) nitrogen and oxygen
- (b) oxygen and carbon dioxide
- (c) chlorine and nitrogen
- (d) ammonia and oxygen

(ix) Ammonia gas is catalytically oxidized to give:

- (a)  $N_2 + H_2O$
- (b)  $NO_2 + H_2O$
- (c)  $NO + H_2O$
- (d)  $N_2O + H_2O$

(x) The organic compound which will undergo substitution reaction is:

- (a)  $C_2H_2$
- (b)  $C_2H_4$
- (c)  $C_{10}H_{18}$
- (d)  $C_2H_6$

(xi) IUPAC name of  $CH_3-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_2-\text{CH}_3$  is:

- (a) 2-methyl butane
- (b) 2-methoxy propane
- (c) butane
- (d) methyl propane

(xii) Period 1 of the Periodic Table comprises of:

- (a) 2 elements
- (b) 8 elements
- (c) 4 elements
- (d) 18 elements

(xiii) The acid that produces carbon from cane sugar is:

- (a) concentrated hydrochloric acid
- (b) concentrated nitric acid
- (c) concentrated sulphuric acid
- (d) concentrated acetic acid

(xiv) A compound with low boiling point:

- (a) sodium chloride
- (b) potassium chloride
- (c) calcium chloride
- (d) carbon tetrachloride

(xv) The inert electrode in the electrolysis of acidified water is:

- (a) Nickel
- (b) Platinum
- (c) Copper
- (d) Silver

### Question 2

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- (i) Name the following: [5]
- (a) First member of alkyne series.
  - (b) Functional group present in ethanol.
  - (c) Functional group present in but-2-ene.
  - (d) Third member of alkane series.
  - (e) Second member of monocarboxylic acid series.

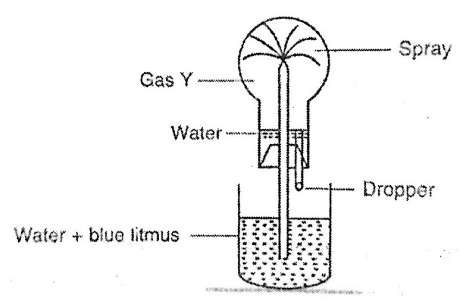
(ii) Fill in the blanks with the choices given: [5]

- (a) The polar covalent compound in gaseous state that does not conduct electricity is \_\_\_\_\_ (methane/ammonia/carbon tetrachloride).
- (b) A salt prepared by displacement reaction is \_\_\_\_\_ (ferric chloride/ferrous chloride silver chloride).
- (c) The number of moles in 11g of nitrogen gas is \_\_\_\_\_ (0.39, 0.49, 0.29)  
[atomic mass of N = 14]
- (d) An alloy that is used to make medals is \_\_\_\_\_ (bronze, brass, fuse metal)
- (e) In Contact process, sulphuric acid is prepared by dissolving \_\_\_\_\_ (sulphur dioxide/sulphur trioxide/oleum) in water.

(iii) Write balanced chemical equations for each of the following: [5]

- (a) Reaction of carbon powder and conc. nitric acid.
- (b) Reaction of excess ammonia with chlorine.
- (c) Reaction of lead nitrate solution with ammonium hydroxide
- (d) Reaction of dilute sulphuric acid with zinc sulphide.
- (e) Complete combustion of ethane.

(iv) Answer the questions that follow the figure given below: [5]



- (a) Identify the gas Y.
- (b) What property of gas Y does this experiment demonstrate?
- (c) What will be the color of the spray inside the inverted flask? Give reason for your answer.
- (d) What is this experiment commonly known as?

(v) Match Column A with Column B [5]

Column A	Column B
i) Duralumin	a). surgical instruments
ii) Ammonia	b). decorative articles & utensils
iii) Brass	c). electroplating
iv) Stainless steel	d). nitrogenous fertilizers
v) Silver	e). aircraft body

## SECTION - B (40 Marks)

Attempt any FOUR questions from this section

### Question 3

- (i) Draw the electron dot structure of : [2]  
a) Nitrogen molecule [Atomic number N = 7; H = 1] b) Ammonium ion
- (ii) Name the particles present in: [2]  
a) Strong electrolyte b) Non-electrolyte
- (iii) Distinguish between following pairs of compounds using the reagent given in the bracket: [3]  
a) Ferrous sulphate solution and Ferric sulphate solution (using sodium hydroxide solution).  
b) Manganese dioxide and copper (II) oxide (using concentrated HCl).  
c) Sodium chloride and potassium nitrate (using concentrated sulphuric acid).
- (iv) Write a balanced chemical equation for the preparation of: [3]  
a) ethene from bromoethane.  
b) ethyne from calcium carbide  
c) methane from sodium acetate.

### Question 4

- (i) Give the chemical formula of: [2]  
a) bauxite b) sodium zincate
- (ii) Name the gas evolved in each of the following cases: [2]  
a) Alumina undergoes electrolytic reduction.  
b) Ammonia reacts with heated copper oxide.
- (iii) Find the empirical formula and the molecular formula of an organic compound [3]  
From the data given below:  
C = 75.92%, H = 6.32% and N = 17.76%  
The vapour density of the compound is 39.5.  
[ C = 12, H = 1, N = 14]
- (iv) Complete the following by selecting the correct option from the choice given: [3]  
a) pH of acetic acid is greater than dil. sulphuric acid. So, acetic acid contains \_\_\_\_\_ concentration of H<sup>+</sup> ions (greater, same, low).  
b) The indicator that does not change colour with the passage of HCl gas is \_\_\_\_\_ (methyl orange, moist blue litmus, phenolphthalein).  
b) The acid that cannot act as an oxidizing agent is \_\_\_\_\_ (conc. HCl, conc. HNO<sub>3</sub>, conc. H<sub>2</sub>SO<sub>3</sub>)

### Question 5

- (i) Draw the electron dot diagram of: [2]  
a) Chlorine molecule  
b) Water molecule
- (ii) Calculate the number of moles present in 160g of NaOH. [2]  
[Atomic mass: Na = 23; H = 1; O = 16]
- (iii) Identify the substances P, Q, R from the following observations: [3]  
Substance P is a blue, crystalline salt. Its aqueous solution produces a pale blue precipitate with ammonium hydroxide. Q dissolves in excess of ammonium hydroxide to form a deep blue solution R.
- (iv) Write balanced chemical equations for the preparation of given salts (a) to (c) by using methods 1 to 3, respectively: [3]  
Method 1: Displacement; Method 2: Precipitation; Method 3: Neutralization  
a) Zinc sulphate  
b) Calcium carbonate  
c) Sodium sulphate

### Question 6

- (i) Identify the terms: [2]  
a) The energy required to remove an electron from the valence shell of a neutral isolated gaseous atom.  
b) The property by which carbon bonds with itself to form a long chain.
- (ii) Write the formula of: [2]  
a) Ethanal  
b) Propanoic acid
- (iii) During the electrolysis of Copper (II) sulphate solution, using copper electrodes: [3]  
a) State what happens at cathode.  
b) State the change noticed in the electrolyte.  
c) What are Spectator ions?

- (iv) Write the reactions for the following conversions: [3]
- Sodium ethanoate (sodium acetate) to methane
  - Bromoethane to ethane
  - Ethene to 1,2 - dichloroethane

**Question 7**

- (i) (a) Why is pure acetic acid called glacial acetic acid? [2]  
 (b) Write the esterification reaction between acetic acid and ethanol, that takes place in the presence of a dehydrating agent like conc.  $H_2SO_4$ .
- (ii) Give IUPAC names of the following: [2]
- $CH_3-CH_2-CH_2-CHO$
  - $CH_3-CH_2-COOH$ .
- (iii) HCl gas is prepared in the laboratory by using conc. sulphuric acid sodium Chloride. Answer the following questions based on the above process: [3]
- Give the balanced equation for the reaction that takes place.
  - Why should nitric acid not be used in this reaction?
  - How is the gas collected?
- (iv) Complete the following reactions: [3]
- $S + \text{conc. } HNO_3 \longrightarrow$
  - $C + \text{conc. } H_2SO_4 \longrightarrow$
  - $Cu + \text{dil. } HNO_3 \longrightarrow$

**Question 8**

- (i) Find the volume occupied by 40g of methane at STP, if its vapour density (V.D.) is 8 [2]
- (ii) Draw electron dot structure of the following: [2]
- $H_3O^+$
  - $CCl_4$
- (iii) (a) Why  $SO_3$  obtained during Contact process is not directly absorbed in water? [3]  
 (b) Name the catalyst used during the Contact process. Write the equation for the reaction taking place in the catalytic chamber.
- (iv) Copy and complete the following paragraph using the options given in brackets: [3]
- Alkenes are a homologous series of (a) \_\_\_\_\_ (saturated /unsaturated) hydrocarbons characterized by the general formula (b) \_\_\_\_\_ ( $C_n H_{2n+2}$  /  $C_n H_{2n}$ ). Alkenes undergo (c) \_\_\_\_\_ (addition / substitution) reactions.

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