

St. Mary's Convent Inter College , Prayagraj
First Terminal Examination 2024-25

Time: 2hrs

Class 10

M.M :80

Chemistry

Name Roll No..... Date.....

Section A is compulsory. Answer any four questions from Section B

The intended marks for questions or parts of questions are given in brackets [].

SECTION - A (40 marks)

Question -1

[15]

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

- i) An aqueous solution of copper sulphate turns colourless on electrolysis. Which of the following could be the electrodes?
P. anode: copper; cathode: copper
Q. anode: platinum; cathode: copper
R. anode: copper; cathode: platinum
 - a. Only P
 - b. Only Q
 - c. Only R
 - d. Both Q and R
- ii) A compound P is heated in a test tube with sodium hydroxide solution. A red litmus paper held at the mouth of the test tube turns blue. Which of the following could compound P be?
 - a. Zinc chloride
 - b. Copper chloride
 - c. Ferric chloride
 - d. Ammonium chloride
- iii) Which of the following would weigh the most? [C=12,O=16,Na=23]
 - a. One mole of sodium
 - b. 11.2 litres of carbon dioxide at STP
 - c. 6.023×10^{22} atoms of carbon
 - d. 2 gram atoms of oxygen
- iv) The property which is **not** a characteristic of a covalent compound is that it
 - a. Is a non conductor of electricity
 - b. Has a low boiling point
 - c. Is a strong electrolyte
 - d. Does not dissolve in water
- v) **Assertion (A)** : Chloride ion is larger in size as compared to the chlorine atom.
Reason (R) : The nuclear charge of the chloride ion is greater than that of the chlorine atom.
 - a. Both A and R are true and R is the correct explanation of A
 - b. Both A and R are true but R is not the correct explanation of A
 - c. A is true but R is false
 - d. Both A and R are false
- vi) When a non metal atom becomes an ion, it
 - a. Loses electron and is oxidised
 - b. Loses electron and is reduced
 - c. Gains electron and is oxidised
 - d. Gains electron and is reduced
- vii) Element 'Q' has electronic configuration 2,8,8,2. The number of oxygen atoms present in the oxide of 'Q' is
 - a. 1
 - b. 2
 - c. 3
 - d. 4

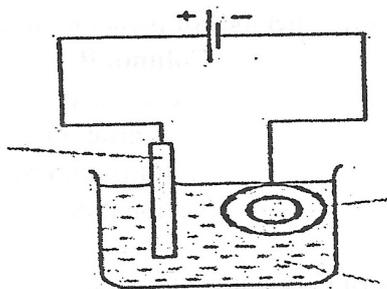
- viii) Which of the following **doesn't** represent oxidation?
- $\text{Cu} - 2\bar{e} \rightarrow \text{Cu}^{2+}$
 - $\text{Fe}^{3+} + \bar{e} \rightarrow \text{Fe}^{2+}$
 - $\text{Fe}^{2+} - \bar{e} \rightarrow \text{Fe}^{3+}$
 - $\text{Fe} \rightarrow \text{Fe}^{3+} + 3\bar{e}$
- ix) A nitrate which forms a precipitate with ammonium hydroxide and also dissolves in excess of it is
- Ferric nitrate
 - Ferrous nitrate
 - Copper nitrate
 - Lead nitrate
- x) Which of the following electronic configuration represents the most electronegative element?
- 2,7
 - 2,8,7
 - 2,6
 - 2,8,6
- xi) **Assertion (A)** : Alkali metals do not form dipositive ions.
Reason (R) : After loss of one electron alkali metals achieve stable electronic configuration of noble gases.
- Both A and R are true and R is the correct explanation of A
 - Both A and R are true but R is not the correct explanation of A
 - A is true but R is false
 - Both A and R are false
- xii) The empirical formula of a compound whose molecular formula is $\text{C}_8\text{H}_6\text{O}_4$ and empirical formula weight is 83 [C=12,O=16,H=1] will be
- $\text{C}_2\text{H}_3\text{O}$
 - $\text{C}_4\text{H}_3\text{O}_2$
 - $\text{C}_8\text{H}_6\text{O}_4$
 - $\text{C}_{16}\text{H}_{12}\text{O}_8$
- xiii) The addition of one of the following solution in excess will help distinguish between aqueous lead(II) nitrate and aqueous zinc nitrate. Identify the solution.
- Potassium hydroxide
 - Sodium hydroxide
 - Ammonium hydroxide
 - Calcium hydroxide
- xiv) Which of the following about oxides is correct?
- A basic oxide is an oxide of non metal
 - Acidic oxides contain ionic bonds
 - Amphoteric oxides contain a metal
 - Basic oxides are always gases
- xv) Among the elements of the second period, the element which has the highest ionisation energy is
- Lithium
 - Carbon
 - Boron
 - Nitrogen

Question - 2

- A) Give the appropriate term defined by the statements given below : [5]
- A bond formed between two atoms by sharing of a pair of electrons, with both electrons being provided by the same atom.
 - A salt formed by the complete neutralisation of an acid by a base.
 - The property of certain metallic oxides due to which they react with both acids and alkalis to form salt and water.
 - Process of separation of ions present in an ionic compound.
 - The energy required to remove an electron from a neutral gaseous atom.

- B) Complete the following by choosing the correct answers from the brackets: [5]
- 1) If an element has seven electrons in the outermost shell, then it is likely to have the -----
--- (smallest / largest) atomic size amongst all the elements in the same period.
 - 2) An ----- (alkaline / acidic) solution will turn methyl orange solution pink or red.
 - 3) ----- (Sulphuric acid / nitric acid) does not form an acid salt.
 - 4) A ----- (reddish brown / dirty green) coloured precipitate is formed when ammonium hydroxide is added to a solution of ferric chloride.
 - 5) The absolute temperature of a gas at 25°C is ----- (298 / 398)

- C) One important application of electrolysis is electroplating. Shown in the figure given below is electroplating of a steel object with silver. Study the figure and answer the questions that follow. [5]



- a. Which ion should be present in the electrolyte for successful electroplating?
- b. Why is the steel object placed at the negative electrode?
- c. The current used for effective, smooth and uniform coating is _____ (low direct current for a longer time / high direct current for a short time)
- d. What change will be observed at the positive electrode?
- e. Write the reaction taking place at the positive electrode.

- D) a. Draw the electron dot structures of the following : [5]

- 1) NaCl
- 2) N_2
- 3) NH_4^+

- b. If 30 litres of oxygen contain 'X' number of molecules, state the number of molecules in
- i) 10 litres of hydrogen
 - ii) 60 litres of ammonia

- E) Match the following : [5]

Column A	Column B
1. Barium chloride	metal
2. Element with nineteen protons	inert
3. graphite	white gelatinous
4. Lead oxide	sulphates
5. Zinc hydroxide	yellow

SECTION- B (40 MARKS)

Question – 3

- a) State one important difference between electrovalent and covalent compounds in terms of : [4]
 - i) Constituent units
 - ii) Melting and boiling point
 - iii) Conduction of electricity
 - iv) Solubility in water
- b) The electron affinity of an element X is greater than that of element Y. [3]
 - i) How is the oxidising power of X likely to compare with that of Y?
 - ii) How is the electronegativity of X likely to compare with Y?
 - iii) State whether X is likely to be placed to the left or to the right of Y in the Periodic table.

- c) You are provided with a list of chemicals mentioned below. [3]

[sodium hydroxide solution, copper carbonate, zinc oxide, hydrochloric acid, copper, dilute sulphuric acid, chlorine, iron]

Using suitable chemicals from the list, write balanced chemical equation for the preparation of salts mentioned below.

- i) Copper sulphate
- ii) Sodium zincate
- iii) Ferric chloride

Question – 4

- a) Match the reactants in Column A to their methods of preparation in Column B. [4]

Column A	Column B
Zinc oxide + sulphuric acid	displacement
Barium chloride + sodium sulphate	neutralisation
Magnesium + hydrochloric acid	neutralisation by titration
Potassium hydroxide + nitric acid	precipitation

- b) On analysis of a solution of lead chloride, Ashutosh found that 6.21g of lead combined with 4.26 g of chlorine. Find the Empirical formula of this chloride. [Pb=207, Cl=35.5] [3]

- c) Give balanced equation in each case. [3]

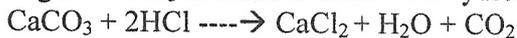
- i) Addition of sodium hydroxide to copper sulphate solution
- ii) Action of heat on lead nitrate
- iii) Addition of sodium hydroxide to aluminium hydroxide.

Question – 5

- a) Yashi electrolysed an aqueous solution of copper sulphate using copper electrodes. [4]
- i) She added traces of sulphuric acid to the electrolyte. Why?
 - ii) Name the electrode where reduction took place.
 - iii) Write the equation for the reaction occurring at the oxidising electrode.
 - iv) What was Yashi's observation at the positive electrode?
- b) How does conduction of electricity by a Copper wire compare with conduction by an aqueous solution of Copper sulphate in terms of: [3]
1. Physical state in which they are good conductors
 2. New products being formed.
 3. Particles responsible for the flow of electricity.
- c) P [2,8,7] and Q [2,8,2] are two elements. Using this information, complete the following. [3]
1. ----- is the non metallic element.
 2. ----- is the reducing agent.
 3. Element P, on becoming stable, will acquire the configuration of element -----.

Question – 6

- a) 10g of CaCO_3 is made to react with hydrochloric acid. From the equation, [4]



Calculate:

- i. The weight of CaCl_2 obtained from 10g of CaCO_3
 - ii. Volume of carbon dioxide obtained at STP at the same time
[Ca=40, C=12, O=16, Cl=35.5]
- b) Write balanced chemical equation in each case: [3]
- i) Reaction of lead (II) hydroxide with sodium hydroxide
 - ii) Action of sodium hydroxide on zinc sulphate
 - iii) Action of hydrochloric acid on magnesium
- c) Rohit has solution X, Y and Z that has pH values 2, 7 and 13 respectively. Which solution [3]
- i) Will liberate carbon dioxide when heated with sodium carbonate?
 - ii) Will give off ammonia gas when heated with ammonium chloride?
 - iii) Will not have any effect on litmus paper?

Question – 7

- a) Select the ion in each case, that would get selectively discharged from the aqueous mixture of the ions listed below: [2]
- $\text{SO}_4^{2-}, \text{NO}_3^-, \text{OH}^-$
 - $\text{Pb}^{2+}, \text{Ag}^+, \text{Cu}^{2+}$
- b) Identify the following: [2]
- The anion present in the salt, which when reacted with dilute HCl, produces a pungent gas which turns lime water milky.
 - The particles present in strong electrolytes.
- c) Calculate the vapour density and molecular mass of CO_2 if 200 cm^3 of the gas weighs 0.40 g at STP. [3]
- d) Complete and balance the following equations: [3]
- $\text{NH}_4\text{OH} + \text{HCl} \rightarrow$
 - $\text{Mg}(\text{OH})_2 + \text{H}_2\text{SO}_4 \rightarrow$
 - $\text{FeCl}_3 + \text{NH}_4\text{OH} \rightarrow$

Question – 8.

- a) State one relevant observation in each case : [4]
- At the anode, when a concentrated solution of sodium chloride is electrolysed.
 - Change in the appearance of the cathode, during the electrolysis of molten lead bromide.
 - Crystals of copper carbonate are heated strongly in a test tube.
 - Sodium hydroxide solution is added in excess to an aqueous solution of calcium nitrate.
- b) Pick up the correct answer from the choices given: [3]
- During electrorefining of copper, the material which makes the anode [impure copper, pure copper, graphite]
 - The metallic electrode which does not take part in an electrolytic reaction [Cu, Ag, Pt]
 - The compound which shows the presence of ionic, covalent as well as co-ordinate bonds [NH_3 , NH_4Cl , NaOH]
- c) Give reason in each case: [3]
- An ionic compound does not conduct electricity in the solid state but does so when heated and brought to the molten form.
 - The ionisation potential of chlorine is greater than that of magnesium.
 - Electrolysis of acidified water is considered as an example of catalysis.

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