HALF YEARLY EXAMINATION: 2024-2025

CLASS: X

SUBJECT: CHEMISTRY

NAME OF STUDENT: ..... MAX. MARKS:80

DATE: ..... TIME: 2 HOURS

.....

NOTE: 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 A is compulsory. Attempt any four questions from Section B. 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 the correct answers from the given options: [15]
(Do not copy the question, write the correct answers only.)

i) Among the elements given below, the element with the least electronegativity is:
   a) Lithium b) Carbon
   c) Boron d) Fluorine

ii) On moving from left to right across a period of the periodic table, the non-metallic character of elements:
   a) decreases. b) increases.
   c) remains the same. d) depends on the period.

iii) When a metal atom becomes an ion:
   a) It loses electrons and is oxidized.
   b) It gains electrons and is reduced.
   c) It gains electrons and is oxidized.
   d) It loses electrons and is reduced.

iv) A weak organic acid is:
   a) Formic acid b) Sulphuric acid
   c) Nitric acid d) Hydrochloric acid

v) **A** - Assertion: The basicity of acetic acid is 1.
   B - Reason: Its molecule ionises by liberating only one hydroxyl ion.
   a) Both the statements are true.
   b) Both the statements are false.
   c) Statement A is true and statement B is false.
   d) Statement A is false and statement B is true.

vi) Which of the following compounds will not react with ammonium hydroxide solution?
   P. Ammonium chloride
   Q. Copper sulphate
   R. Zinc sulphate
   a) Only P b) Only R
   c) Both P and R d) Both P and Q

vii) The empirical formula of a compound is CH_2O, the possible molecular formula can be:
   a) $C_3H_6O_3$ b) C_2H_4O
   c) $C_4H_3O_2$ d) C_4H_8O

viii) The metallic electrode which does not take part in an electrolytic reaction:
   P. Copper
   Q. Silver

R. Platinum

a) Only P
b) Only R
c) Only Q
d) Both Q and R

ix) The relative molecular mass of butane C_4H_{10} is 58, then its vapour density will be:

a) 5
b) 29
c) 32
d) 16

x) A covalent bond is formed when atoms share electrons. Identify the covalent molecule where a pair of shared electrons is shifted towards an atom with high electronegativity.

a) Cl_2
b) HCl
c) CH_4
d) H_2

xi) A – Assertion: A commonly used drying agent for ammonia is calcium oxide.
B – Reason: Calcium oxide reacts with ammonia.

a) Both these statements are true.
b) Both these statements are false.
c) Statement A is true and the statement B is false.
d) Statement A is false and statement B is true.

xii) The salt solution which does not react with ammonium hydroxide but gives white ppt with sodium hydroxide:

a) Calcium nitrate
b) Zinc nitrate
c) Lead nitrate
d) Copper nitrate

xiii) Hydrogen sulphide gas smells like that of:

a) Dead animals
b) Burning matchstick
c) Rotten eggs
d) Odourless

xiv) The electrolysis of acidified water is an example of:

a) Reduction
b) Oxidation
c) Redox reaction
d) Synthesis

xv) Which element has the greatest ability to attract a shared pair of electrons among the following:

a) Aluminium
b) Chlorine
c) Magnesium
d) Sulphur

Question 2

i) Complete the following by choosing the correct answers from the bracket: [5]

a) If an element has a low ionization energy, then it is likely to be a..... (metallic/non-metallic) element.
b) Electrovalent compounds have a ..... (low/ high) boiling point.
c) If a piece of magnesium reacts with dilute sulphuric acid, evolution of ..... (hydrogen/ oxygen) gas will take place.
d) The gelatinous white precipitate which is soluble in excess of ammonium hydroxide is of ..... (calcium hydroxide/ zinc hydroxide).
e) The ratio between the number of molecules in 2g of hydrogen and 32 g of oxygen is ..... (1:1/1:18).

ii) Name the following: [5]

a) The element present in period 3 and Group 1 of the periodic table.
b) A bond formed by a shared pair of electrons with both electrons coming from the same atom.
c) A salt formed by incomplete neutralisation of an acid by a base.
d) The cation present in a solution which gives a reddish-brown precipitate with NaOH solution.
e) The term for the number of atoms in 12 g of C-12 isotope of carbon.

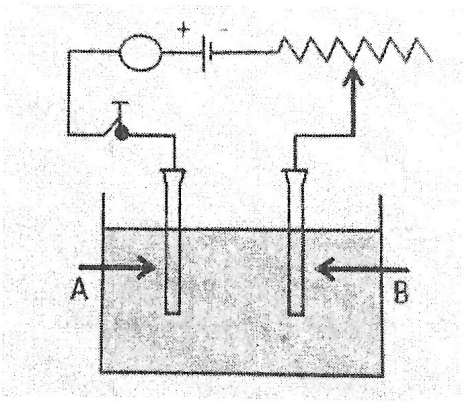
iii) Solve the following:

a) Calculate the volume of oxygen required at STP for the complete combustion of 20 cm^3 of propane (C_3H_8). Also calculate volume of carbon dioxide produced. [2]
$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
b) An organic compound with vapour density 94 contains C = 12.67%, H = 2.13% and Br = 85.11%. Find its molecular formula. [Atomic mass of C = 12, H = 1, Br = 80] [3]

iv) Match the salts given in Column A with their methods of preparation given in Column B. [5]

Column A	Column B
a) Lead nitrate from lead oxide	1. Displacement
b) Magnesium chloride from magnesium	2. Titration
c) Ferric chloride from iron	3. Neutralization
d) Sodium nitrate from sodium hydroxide	4. Precipitation
e) Zinc carbonate from zinc sulphate	5. Combination

v) Study the diagram given below and answer the questions that follows: [5]



a) Give the names of the electrodes A and B.
b) Which electrode is the oxidizing electrode?
c) Write the balanced chemical equations which take place at electrodes A and B, if the electrolyte is molten lead bromide.

SECTION B (40 Marks)

(Attempt any four questions from this Section)

Question 3

i) Arrange the following as per instructions given in the brackets. [3]
   a) Cl, F, Br, I (increasing electron affinity)
   b) Cs, Na, Li, K (decreasing electronegativity)
   c) Mg, Cl, Na, S, Si (decreasing order of atomic size)

ii) Give a chemical test to distinguish between the following pairs of chemicals: [2]
   a) Lead nitrate solution and Zinc nitrate solution
   b) Ferrous sulphate solution and Ferric sulphate solution

iii) A cylinder contains 68 g of ammonia gas at STP. [3]
   a) What is the volume occupied by this gas?
   b) How many moles of ammonia are present in the cylinder?
   c) How many molecules of ammonia are present in the cylinder?

iv) Using nitric acid, how will you convert: [2]
   a) Carbon to carbon dioxide?
   b) Copper to copper nitrate?

Question 4

i) The atomic number of an element Z is 16. State: [3]
   a) The period to which it belongs.
   b) The number of valence electron(s) in the element.
   c) Whether the element is a metal or a nonmetal.

ii) Write the equation for the following reactions: [2]
   a) Zinc oxide is treated with sodium hydroxide solution.
   b) Ammonium chloride is heated with sodium hydroxide.

iii) Differentiate between the following pairs based on the information given in the brackets: [3]
   a) Metallic conductor and electrolyte (conducting particles)
   b) Cations and anions (formation from an atom)
   c) Acid and alkali (formation of type of ions)

iv) Bobby wants to keep a practical notebook based on his visit to the chemistry lab. What should he note for records in the following experiments? [2]
   a) Ammonia gas is passed over heated copper (II) oxide.
   b) Zinc sulphate solution is mixed with excess of ammonium hydroxide solution.

Question 5

i) The following table shows the electronic configuration of the elements W, X, Y and Z. [4]

Element	W	X	Y	Z
Electronic configuration	2, 8, 1	2, 8, 7	2, 5	1

Answer the following questions based on the table above:

   a) What type of bond is formed between:
      A. W and X
      B. Y and Z?
   b) What is the formula of the compound formed between:
      A. X and Z
      B. W and X?

ii) Draw an electron dot diagram for the formation of each of the following: [3]
   a) Hydronium ion
   b) Methane
   c) Calcium oxide

iii) With reference to Haber's Process answer the following questions: [3]
   a) What is the purpose of Haber's Process?
   b) Name the gaseous inputs of the Haber's Process.
   c) What is done to increase the rate of the reaction in the Haber's Process?

Question 6

i) The following table shows the tests Mohan performed on aqueous solution of A and B. What are his observations? [2]

Test	Observations	Conclusion
a)To solution A, NaOH solution was added.		A contains lead (II) ions.
b)To solution B, NH_4OH solution was added slowly till it was in excess.		B contains copper (II) ions.

ii) Define ionisation potential. [1]

iii) The following table represents the elements and their atomic numbers. [3]

Element	Atomic number
P	13
Q	7
R	10

With reference to this, answer the following using only the alphabets given in the table.

a) Which element combines with hydrogen to form a basic gas?
b) Which element has an electron affinity zero?
c) Name the element which forms an ionic compound with chlorine.

iv) A solution of hydrogen chloride in water is prepared. The following substances are added to separate portions of the solution. Name the gas evolved in each case. [4]

a) Calcium carbonate
b) Magnesium ribbon
c) Manganese (IV) oxide with heating
d) Sodium sulphide

Question 7

i) Match the element in column A with the properties given in column B: [5]

Column A	Column B
a)Silicon	1.An alkali metal
b)Neon	2.Diatomic gas
c)Oxygen	3.A metalloid
d)Sodium	4.An alkaline earth metal
e)Magnesium	5.Inert gas

ii) Give a reason for each of the following: [2]

a) Alkali metals are good reducing agents.
b) Conductivity of dilute hydrochloric acid is greater than that of acetic acid.

iii) The pH values of three solutions A, B and C are as follows: [3]

A = 12, B = 2, C = 7

Answer the following questions:

a) Which solution will not affect the litmus solution?
b) Which solution will liberate carbon dioxide when reacted with sodium carbonate?
c) Which solution will turn red litmus blue?

Question 8

i) 1.56 g of sodium peroxide reacts with water according to the following equation: [3]

$$2Na_2O_2 + 2H_2O \rightarrow 4NaOH + O_2$$

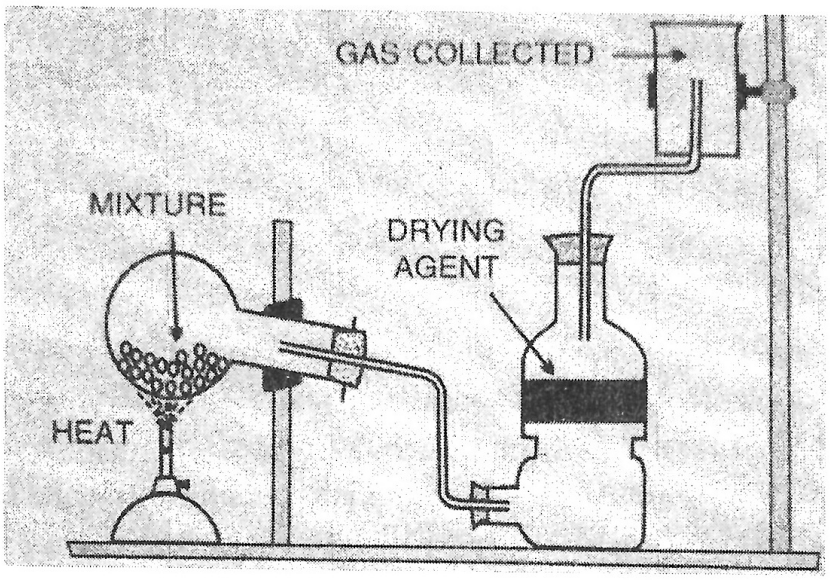
Calculate:

a) Mass of sodium hydroxide formed.

b) Volume of oxygen liberated at STP.
c) Mass of oxygen liberated.

[Given: Relative atomic mass of Na = 23, O=16, H=1]

ii) The diagram below shows the setup for the laboratory preparation of a pungent alkaline gas: [5]



a) Name the gas collected in the jar.
b) Give a balanced equation for the above preparation.
c) State how the above gas is collected.
d) Name the drying agent used.
e) State how will you find out that the jar is full of the pungent gas.

iii) Differentiate between the following pairs: [2]
a) Ionization and dissociation.
b) Polar covalent compounds and non-polar covalent compounds.

END