Grade X

Chemistry

M.M : 80

Q 1. Choose one correct answer to the questions from the given options: [15]

(i) Elements belonging to the same group have similar properties, because:
(a) they have similar electronic configuration in valence shell.
(b) their atomic number increase as we move down a group.
(c) they are all metallic or non –metallic elements.
(d) their number of electrons increase steadily.

(ii) With the increase in atomic number in a period:
(a) the metallic character increases. (b) the metallic character decreases.
(c) the chemical reactivity decreases. (d) the chemical reactivity increases.

(iii) Amongst lithium, sodium and potassium the atomic size of :
(a) All of them is same. (b) Sodium has largest atomic size.
(c) Lithium has the largest atomic size (d) Potassium has the largest atomic size

(iv) Amongst Be, B, Si, C and Cl:
(a) Be and B are metalloids. (b) Be and Si are metalloids.
(c) Si and Cl are metalloids. (d) Si and C are metalloids.

(v) On moving horizontally across a period, the number of electrons in outermost shell increase from:
(a) 2 to 8 (b) 1 to 8 (c) 1 to 18 (d) 2 to 18

(vi) Magnesium atom loses 2 electrons in its valence shell to acquire the stable configuration of nearest noble gas is :
(a) Neon (b) Argon (c) Helium (d) None of these

(vii) A compound of two non –metals which dissolves in water to form an alkali is :
(a) methane (b) carbon dioxide (c) Phosphorous penta oxide (d) Ammonia

(viii) One twelfth mass of carbon atom $_6C^{12}$ is called :
(a) Atomic mass (b) Atomic number (c) atomic mass unit (d) All of these

(ix) The electrolyte used during sliver plating is :
(a) silver nitrate solution (b) fused silver chloride
(b) sodium argento cyanide solution (d) all of these

(x) Non-metals are generally
(a) oxidizing agents (b) reducing agents (c) bleaching agents (d) neutral in nature

(xi) A strong electrolyte from the following is:
(a) Acetic acid (b) Oxalic acid (C) Ammonium hydroxide (d) Sodium hydroxide

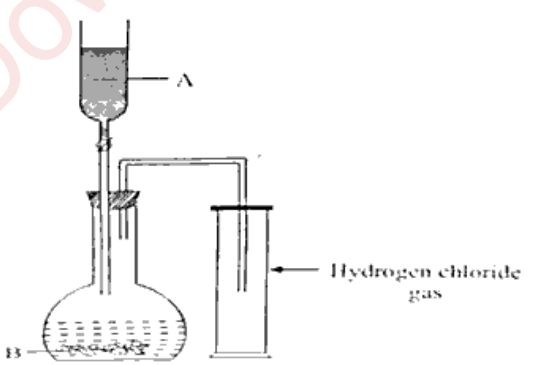
(xii) Electron affinity is maximum in:
(a) Alkali metals (b) Alkaline earth metals (c) Halogens (d) Inert gases

(xiii) The main components of brass are:
(a) Copper and zinc (b) Copper and lead (c) Copper and tin (d) Copper and iron

(xiv) The drying agent used to dry NH_3 is:
(a) P_2O_5 (b) conc. H_2SO_4 (c) $CaCl_2$ (d) CaO

(xv) The general formula of alkynes is:
(a) C_nH_{2n-2} (b) C_nH_{2n+2} (c) C_nH_{2n} (d) $C_nH_{2n+2}O$

Q 2. (i) The diagram shows an apparatus for the laboratory preparation of hydrogen chloride. [5]



(a) Identify A and B.
(b) Write the equation for the reaction.
(c) How would you check whether or not the gas jar is filled with hydrogen chloride?
(d) What does the method of collection tell you about the density of hydrogen chloride?

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

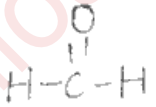
Column A	Column B
(a) Sodium chloride	1. Increases
(b) Ammonium ion	2. Covalent bond
(c) Electronegativity across the period	3. Ionic bond
(d) Non metallic character down the group	4. Covalent and Coordinate bond
(e) Carbon tetrachloride	5. Decreases

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

(a) The basicity of Acetic Acid is _____ (3, 1, 4)
(b) The compound formed when ethanol reacts with sodium is _____ (sodium ethanoate, sodium ethoxide, sodium propanoate)
(c) Quicklime is not used to dry HCl gas because_____(CaO is alkaline, CaO is acidic, CaO is neutral)
(d) Ammonia gas is collected by _____(an upward displacement of air, a downward displacement of water, a downward displacement of air)
(e) Cold, dilute nitric acid reacts with copper to form _____(Hydrogen, nitrogen dioxide, nitric oxide)

(iv) Identify the following: [5]
(a) The energy required to remove an elcctron from valence shell of a neutral isolated gaseous atom.
(b) Name the main constituent metal in the alloy duralumin.
(c) The property by which carbon bonds with itself to form a long chain.
(d) A bond formed by a shared pair of electrons with both electrons coming from the same atom.
(e) A substance that conducts electricity in molten or aqueous state.

(v) (a) Draw the structural formula for the following:
1. Methanoic acid 2. Ethanal 3. Ethyne
(b) Name the following organic compounds in IUPAC system:

1. H-C. H 

2. H_3C--C--- CH_3

Section B

Q 3.

(i) (a) Name two acids used in the formation of aqua regia. [2]
(b) What is the ratio of these acids?

(ii) Write the products and balance the equation. [2]
(a) $CuO(s) + NH_3(g)$ ⇨
(b) $NH_3(g) + Cl_2$ (g) ⇨

(iii) Arrange the following as per the instruction given in the brackets. [3]
(a) Na, Al, Cl [increasing order of lionization potential]

(b) O_2, N_2, Cl_2 [increasing order of number of covalent bonds]
(c) Zn^{2} +, Na+, Cu^{+2} [order of preference of discharge at the cathode]

(iv) Fill in the blanks selecting the appropriate word from the given choice : [3]
(a) Metals have ..... ionisation potential. (low/high)
(b) Group 18 elements have ..... valence electrons (4/8) with the exception of helium.
(c) Group 2 elements are called..... metals (alkali/alkaline earth).

Q 4.

(i) The metals of Group 2 from top to bottom are Be, Mg, Ca, Sr, and Ba. [2]
(a) Which one of these elements will form ions most readily and why?
(b) State the common feature in the electronic configuration of all these elements.

(ii) (a) Calculate the vapour density of ethene [C = 12, H = 1]
(b) Give the empirical formula of $C_6H_{18}O_3$ [2]

(iii) (a) Ammonia gas can be prepared from magnesium nitride. Write a fully balanced equation for the preparation of gas.
(b) Why ammonia gas is not prepared in laboratory by above mentioned method. [3]
(c) The solution of ammonia in water behaves as an alkali. Explain.

(iv) Give reasons for each of the following:
(a) Direct absorption of HCl gas in water is not preferred. [3]
(b) All glass apparatus is used in the laboratory preparation of HNO_3
(c) NaCl has a high melting point.

Q 5.

(i) Name the gas that is produced in the following cases :
(a) Sulphur is oxidised by concentrated nitric acid. [2]
(b) Action of cold and dilute nitric acid on copper

(ii) Identify the substance in each of the following :
(a) The electrode that increases in mass during the electro-refining of silver. [2]
(b) The catalyst used to oxidise ammonia into nitric oxide

(iii) State how the following conversions can be carried out.
(a) Ethyl chloride to ethyl alcohol (b) Ethyl alcohol to ethene. (c) Ethyl bromide to ethane. [3]

(iv) State your observations when:
(a) Barium chloride solution is added to sodium sulphate solution. [3]
(b) Neutral litmus solution is added to solution of carbon dioxide in water.
(c) Small piece of copper is placed in silver nitrate solution.

Q 6.

(i) (a) What do you understand by the term empirical formula?
(b) A compound of X and Y has the empirical formula XY_2. Its vapour density is equal to its empirical formula weight. Determine its molecular formula. [2]

[2]

(ii) Given: $2C_2H_6 + 7O_2 \Rightarrow 4CO_2 + 6H_2O$
2000 cc of O_2 was burnt with 400 ce of ethane. [2]
Calculate the volume of CO_2 formed and unused O_2.

(iii) Identify the gas evolved in each of the following cases: [3]
(a) A colourless gas liberated on decomposition of nitric acid.
(b) Water is added to calcium carbide
(c) Dilute hydrochloric acid is added to Zinc sulphide.

(iv) Mention the property of conc. H_2SO_4 exhibited in each of the following reactions with: [3]

(a) sugar (b) metallic chloride (c) non-metal such as carbon.

Q 7.

(1) A compound gave a following data: [2]

C 57.82%, O = 38.58% and the rest hydrogen. Its relative molecular mass is 166.

Find its empirical formula and molecular formula.

[C = 12, O = 16, H = l]

(ii) Identify the functional group in the following organic compounds. [2]

(a) C_2H_5OH (b) CH_3-----CO-----CH_3

(iii) Classify the following as oxidation and reduction reaction, also complete the reaction. [2]

(a) $Cu \Rightarrow Cu^{2+}$ (b) $Fe^{3} \Rightarrow Fe^{2+}$ (c) $Cl^{-} \Rightarrow Cl$

(v) From the list of the following salts choose the salt that most appropriately fits the description given in the following: [3]

[$Ca(NO_3)_2$; $ZnCO_3$; AgCl; $PbCO_3$,; $MgCl_2$]

(a) A deliquescent salt (b) An insoluble chloride (c) On heating this salt, a brown coloured gas is evolved

Q 8.

(i) Give the electron dot structure of the following [2]

(a) NH_3 (b) CH_4

(ii) Distinguish between the following pairs of compounds using the test given within the brackets. [2]

(a) Calcium sulphite and calcium carbonate (using dil. HCl)

(b) Lead nitrate solution and Zinc nitrate solution (using an alkali)

(iii) Draw a neat and well labelled diagram for the silver plating on a brass article. [3]

(iv) There are three elements E, F, G with atomic numbers 19, 8 and 17 respectively. [3]

(a) Classify the elements as metals and non-metals.

(b) Give the molecular formula of the compound formed between E and G and state the type of chemical bond in this compound.