

SECTION A

(Attempt all questions from this Section)

Question 1

[15]

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

- i. The valency of copper in Cu_2O is:

(a) +1	(b) -2
(c) +2	(d) -1
- ii. The least reactive non-metal is:

(a) Bromine	(b) Gold
(c) Platinum	(d) Iodine
- iii. The formulae of two chlorides of lead are:

(a) PbCl and PbCl_2	(b) PbCl_2 and PbCl_3
(c) PbCl_3 and PbCl_4	(d) PbCl_2 and PbCl_4
- iv. The percentage composition of carbon in C_5H_{12} [C=12, H=1] is:

(a) 89%.	(b) 83%.
(c) 84%.	(d) 87%.
- v. The gas evolved when nitrogen combines with hydrogen:

(a) Hydrogen nitride	(b) Nitrogen dioxide
(c) Nitrous oxide	(d) Ammonia
- vi. The solution which changes to yellowish brown in color when passed through chlorine gas:

(a) Sodium hydroxide	(b) Potassium iodide
(c) Ferric hydroxide	(d) Mercurous iodide
- vii. Substances which readily absorbs moisture from other substances without chemically reacting with them:

(a) Dehydrating agents	(b) Anhydrous substances
(c) Drying agents	(d) Reducing agents
- viii. The orange colored substance which burns with flashes of light on heating:

(a) Sodium bicarbonate.	(b) Ammonium bicarbonate.
(c) Sodium dichromate.	(d) Ammonium dichromate.
- ix. The chemical symbol 2O_2 represents :

(a) 8 atoms of oxygen	(b) 2 atoms of oxygen.
(c) 2 molecules of oxygen	(d) 4 molecules of oxygen
- x. The salt which is formed after heating calcium hydrogen carbonate:

(a) Calcium hydroxide	(b) Hydrogen carbonate
(c) Calcium carbonate	(d) Hydrogen bicarbonate
- xi. Which of the following will lose two electrons to form a cation:

(a) Ammonium	(b) Magnesium
(c) Calcium	(d) Oxygen

- xii. The solubility of this solid decreases after attaining a certain temperature:
 (a) Calcium sulphate (b) Sodium nitrate
 (c) Potassium bromide (d) Potassium sulphate
- xiii. The chemical properties of elements are decided by:
 (a) The number of valence electrons (b) Atomic number
 (c) Electrons present in the first shell (d) Mass number
- xiv. Which type of bond is present in the molecule of hydrogen chloride:
 (a) Electrovalent bond (b) Double covalent bond
 (c) Single covalent bond (d) One ionic and one single covalent bond
- xv. A colorless, odourless gas which is neutral to litmus:
 (a) Oxygen (b) Ammonia
 (c) Carbon dioxide (d) Hydrogen sulphide

Question 2

- i. When hydrated copper sulphate is heated in a test tube, drops of colorless liquid condense on the cooler parts of the test tube. [5]
 Answer the following questions with respect to the chemical reaction.

- (a) Write a balanced chemical equation for the reaction.
 (b) Find the relative molecular mass of the anhydrous salt formed. [Cu=63.5, H=1, S=32, O=16]
 (c) Name the acid radical in the salt formed as a product.
 (d) State one relevant observation for the reaction.
 (e) State the type of chemical reaction.

- ii. Match the following column A with column B. [5]

Column A	Column B
(a) Chromium ion	1. Forms lather with soap
(b) Electrovalent bond	2. Calcium hydroxide
(c) Slaked lime	3. Calcium sulphate
(d) Soft water	4. Electropositive ion
(e) Hard water	5. Calcium oxide

- iii. Complete the following by choosing the correct answers from the brackets: [5]

- (a) The chemical formula of epsom salt is _____ (FeSO₄.10H₂O / MgSO₄.7H₂O).
 (b) The mass of _____ (electron / proton) is 9.1×10^{-28} gm.
 (c) The insoluble product formed after the mixing of two solutions is known as _____ (residue / precipitate).
 (d) A phenomenon where a compound loses its water of crystallization on exposure to dry air is called _____ (efflorescence / deliquescence).
 (e) _____ (double decomposition / thermal displacement) is the type of reaction in which two compounds exchange their positive and negative radicals.

- iv. Identify the following: [5]

- (a) A gas which burns with a pale blue flame.
 (b) A gas having an offensive rotten egg smell.
 (c) A metal carbonate which is stable to heat and is soluble in water.
 (d) An isotope having only one electron, one proton and no neutron.
 (e) A bond formed between two atoms by sharing of electrons.

- (a) Draw the atomic orbital structure for the formation of Sodium chloride. [3]
 (b) Write two observations when ferrous sulphate decomposes on heating. [2]

SECTION B

(Attempt any four questions.)

Question 3

- i. The valency of metal 'X' is +3. Give the formula of its: [2]
 (a) carbonate (b) hydroxide
- ii. Calculate the percentage of nitrogen in ammonium nitrate. [2]
 [H=1, N=14, O=16]
- iii. Give a balanced chemical equation for the following reactions: [3]
 (a) When sulphuric acid reacts with potassium hydroxide.
 (b) Thermal decomposition of copper nitrate.
 (c) Zinc sulphide reacts with hydrochloric acid.
- iv. Give reason why: [3]
 (a) It is difficult to find absolutely pure water in nature.
 (b) The electronic configuration of magnesium ion and an atom of neon are same.
 (c) Atom of non-metallic elements usually form anions.

Question 4

- i. State one relevant observation in the following cases: [2]
 (a) Lead nitrate is strongly heated in a test tube.
 (b) Barium chloride solution is added to dilute sulphuric acid.
- ii. Define: [2]
 (a) Solubility of a substance (b) Supersaturated solution
- iii. Draw the atomic structural diagram for the formation of carbon tetrachloride molecule. [3]
- iv. Name the following: [3]
 (a) A greenish yellow gas with a sharp pungent choking odour.
 (b) The color of the metal formed when AgCl is exposed to sunlight.
 (c) A metal which burns with a dazzling white flame.

Question 5

- i. Answer the following: [3]
 (a) What do you observe when HCl gas is passed through red litmus solution?
 (b) Name the gas evolved when zinc reacts with dilute sulphuric acid.
 (c) How can we differentiate between CO₂ and NO₂ based on a chemical test?
- ii. Write the common names for the following compounds: [3]
 (a) Sodium sulphate decahydrate
 (b) Calcium oxide
 (c) Anhydrous sodium carbonate
- iii. An atom of an element is represented as ${}^{19}_{9}Q$. Find: [4]
 (a) Number of neutrons present in the nucleus of 'Q'.
 (b) Valency of the element 'Q'.
 (c) Number of shells present in the atom 'Q'.
 (d) Write the chemical formula formed when the element 'Q' and calcium react with each other.

Question 6

- i. Define: [2]
(a) Relative atomic mass (b) Radical
- ii. Write the chemical formulae for the following: [2]
(c) Potassium metaluminate (d) Aluminium Sulphide
- iii. Temporary hardness is removed from water by the process of boiling. [3]
(a) Write a balanced chemical equation for the process mentioned above.
(b) Mention one more method for the removal of hardness from water.
(c) Give one advantage of hard water.
- iv. Balance the following chemical equations: [3]
(a) $\text{NO}_2 + \text{H}_2\text{O} \rightarrow \text{HNO}_3 + \text{HNO}_2$
(b) $\text{C} + \text{H}_2\text{SO}_4 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{SO}_2$
(c) $\text{Zn} + \text{HNO}_3 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{H}_2\text{O} + \text{NO}_2$

Question 7

- i. (a) Define neutralization reaction. [2]
(b) Arrange the elements in the increasing order of their reactivity:
Ca, Al, Pb, Zn, Na
- ii. Define: [2]
(a) Hygroscopy (b) Ionic bond
- iii. State one observation for the following when: [3]
(a) A rod dipped in ammonia solution is brought near hydrogen chloride gas.
(b) Oxygen gas is passed through alkaline pyrogallol solution.
(c) Carbon dioxide gas is passed through lime water first in small amounts and then in excess.
- iv. Fill in the blanks: [3]
(a) A soluble base is termed as _____.
(b) There are _____ isotopes of chlorine.
(c) The chemical name of $\text{CH}_3\text{CO}_2\text{K}$ is _____.

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