

Chapter: 13

Q.1 Match the pair

4

1	Column - A	Column - B
	i. Sodium chloride	a. Reactant in combustion process
	ii. Water	b. Chemical change
		c. Ionic bond
		d. Covalent bond

Ans	i. Sodium chloride	Ionic bond
	ii. Water	Covalent bond

2	Column-A	Column-B
	i. Carbon	a. Physical change
	ii. Fluorine	b. Reactant in combustion process
		c. Tendency to form ionic bond
		d. Tendency to form anion

Ans	i. Carbon	Reactant in combustion process
	ii. Fluorine	Tendency to form anion

3	Column - A	Column - B
	i. Photosynthesis	a. Physical change
	ii. Dissolution of salt in water	b. Covalent bond
		c. Tendency to form ionic bond
		d. Chemical change

Ans	i. Photosynthesis	Chemical change
	ii. Dissolution of salt in water	Physical change

4	Column - A	Column - B
	i. Fluorine	a. Physical change
	ii. Magnesium	b. Reactant in combustion process
		c. Tendency to lose electrons
		d. Tendency to form anion

Ans	i. Fluorine	Tendency to form anion
	ii. Magnesium	Tendency to lose electrons

Q.2 Write Short Notes

2

1 Softening of hard water.

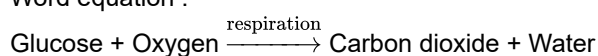
- Ans**
- Some wells or tube wells have hard water. It is brackish to taste and does not form lather with soap.
 - This is because of hard water contains the chloride and sulphate salts of calcium and magnesium in dissolved state. To soften the hard water, a solution of washing soda is added to it.
 - This results in a chemical reaction to form a precipitate of insoluble carbonate salts of calcium and magnesium.
 - As the dissolved salts of calcium and magnesium go out in the form of precipitate of the carbonate salts, the water is softened.

Q.3 Answer the following

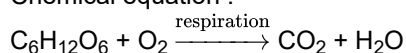
2

1 Write the equation for Respiration.

Ans Word equation :



Chemical equation :

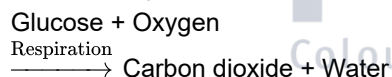


Q.4 Explain the statement.

12

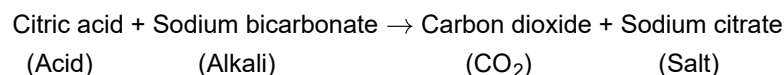
1 Respiration is a chemical change.

- Ans**
- Respiration is a biological process that occurs continuously.
 - In this process, living organisms inhale air and exhale carbon dioxide.
 - Through detailed study, it is learnt that glucose in the cells reacts with oxygen from the inhaled air to form carbon dioxide and water. Hence, respiration is a chemical change.
 - The word equation for a chemical change occurring in respiration is as follows :



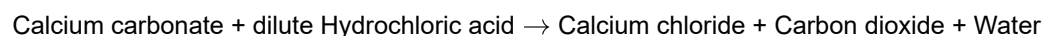
2 Bubbles are seen on adding lemon juice to baking soda.

- Ans**
- When baking soda is added to lemon juice, a chemical change takes place.
 - Citric acid present in the lemon juice reacts with baking soda to form carbon dioxide gas and sodium citrate.
 - The released carbon dioxide gas produces bubbles.
Hence, bubbles are seen on adding lemon juice to baking soda.
 - The word equation is as follows:



3 Lime stone powder disappears on adding to dilute hydrochloric acids.

- Ans**
- Lime stone powder is calcium carbonate.
 - Lime stone powder reacts with dilute hydrochloric acid and three products are formed.
 - The products are calcium chloride, carbon dioxide gas and water.
The first product, calcium chloride is water soluble and mixes up air while the third product, water mixes up with water.
 - The second product, carbon dioxide forms bubbles and mixes up in air while the third product, water mixes up with water.
Hence, lime stone powder disappears on adding to dilute hydrochloric acids.
 - The word equation is,



4 Hard water gets softened on mixing with a solution of washing soda.

- Ans**
- Hard water is water that contains the chloride and sulphate salts of calcium and magnesium in dissolved

form.

- ii. When washing soda (sodium carbonate) is added to hard water, a chemical reaction occurs.
- iii. In this reaction, precipitate of insoluble carbonate salts of calcium and magnesium is formed.
- iv. Since the dissolved salts of calcium and magnesium are removed in the form of insoluble carbonate salts as precipitate, the water gets softened. Hence, hard water gets softened on mixing with a solution of washing soda.
- v. The word equation for the removal of calcium from hard water is,
$$\text{Calcium chloride} + \text{Sodium carbonate} \rightarrow \text{Calcium carbonate} + \text{Sodium chloride}$$

(Washing soda)

Q.5 Complete the sentences in paragraph

3

- 1** Complete the statement by filling the gaps using appropriate term from the terms given in the bracket.
(slow, coloured, arrow, fast, smell, milky, physical, product, chemical, reactant, covalent, ionic, octet, duplet, exchange, sharing, equality sign)
Complete the paragraph:

- a. An is drawn in between the reactants and products while writing the equation for a chemical reaction.
- b. Rusting of iron is a chemical change.
- c. The spoiling of food is a chemical change which is recognized from the generation of certain due to it.
- d. A colourless solution of calcium hydroxide in a test tube turns on blowing in it through a blow tube for some time.
- e. The white particles of baking soda disappear when put in lemon juice. This means that it is a change.
- f. Oxygen is a in respiration.
- g. Sodium chloride is compound while hydrogen chloride is compound.
- h. Electron is complete in each hydrogen in a hydrogen molecule.
- i. Chlorine (Cl₂) molecule is formed by of electrons between two chlorine atoms.

- Ans** An **arrow** is drawn in between the reactants and products while writing the equation for a chemical reaction.
- a. An **arrow** is drawn in between the reactants and products while writing the equation for a chemical reaction.
 - b. Rusting of iron is a **slow** chemical change.
 - c. The spoiling of food is a chemical change which is recognized from the generation of certain **smell** due to it.
 - d. A colourless solution of calcium hydroxide in a test tube turns **milky** on blowing in it through a blow tube for some time.
 - e. The white particles of baking soda disappear when put in lemon juice. This means that it is a **chemical** change.
 - f. Oxygen is a **reactant** in respiration.
 - g. Sodium chloride is **ionic** compound while hydrogen chloride is **covalent** compound.
 - h. Electron **duplet** is complete in each hydrogen in a hydrogen molecule.
 - i. Chlorine (Cl₂) molecule is formed by **sharing** of electrons between two chlorine atoms.

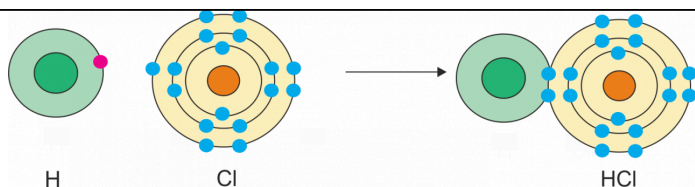
Q.6 Answer the following in detail

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- 1** Show with the help of diagram of electronic configuration how the following compound are formed from the constituent atoms.
Hydrogen chloride

Ans Formation of HCl molecule:

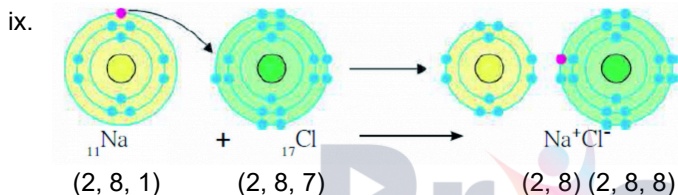
- i. An atom of chlorine contains seven electrons in its valence shell and it needs one electron to complete the electron octet. Therefore, valency of chlorine atom is one.
- ii. An atom of hydrogen contains only one electron and it needs only one electron to complete its electron duplet. Therefore, valency of hydrogen atom is one.
- iii. The chlorine atom completes its octet by sharing its one valence electron with the hydrogen atom. The hydrogen atom also completes its electron duplet.
- iv. This results in the formation of one covalent bond.
- v. The diagrammatic representation for the formation of HCl is as follows:



- 2** Show with the help of diagram of electronic configuration how the following compound are formed from the constituent atoms.

Sodium chloride

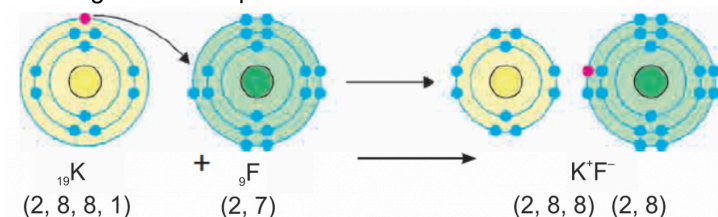
- Ans**
- Sodium chloride is formed from its constituent elements, sodium ($_{11}\text{Na}$) and chlorine ($_{17}\text{Cl}$).
 - The electronic configuration of sodium is (2,8,1) and that of chlorine is (2, 8, 7).
 - The valency of sodium is 1 as it has one electron in valence shell (M-shell). The valency of chlorine is 1 as it has 7 electrons in its valence shell (M-shell) and it just needs one electron to complete the octet.
 - Sodium loses its valence electron from M-shell and hence, the penultimate L-shell becomes the outermost shell which has 8 electrons in it. Thus, sodium attains a complete electron octet.
 - On loss of electron, the number of electrons in sodium becomes 10. Therefore, the total positive charge of +11 on sodium nucleus is imbalanced. Thus, a Na^+ cation which carries net positive charge +1 is formed.
 - Similarly, chlorine gains one electron to complete its octet in M-shell. However, the charge is imbalanced on chlorine nucleus. Thus, a Cl^- anion which carries net negative charge -1 is formed.
 - When elements of sodium and chlorine combine, a sodium atom gives its valence electron to a chlorine atom. In the process, Na^+ cation and Cl^- anion are formed.
 - These oppositely charged cations and anions are attracted by electrostatic force of attraction resulting in the formation of chemical bond which is also called ionic bond or electrovalent bond.



- 3** Show with the help of diagram of electronic configuration how the following compound are formed from the constituent atoms.

Potassium fluoride

- Ans**
- Formation of K^+F^- from $_{19}\text{K}$ and $_{9}\text{F}$:
 - The electronic configuration of potassium is (2,8,8,1) and that of fluorine is (2,7).
 - The valency of potassium is 1 as it has one electron in valence shell (N-shell). The valency of fluorine is 1 as it has 7 electrons in its valence shell (L-shell) and it just needs one electrons to complete the octet.
 - Potassium loses its valence electron from N-shell and hence, the penultimate M-shell becomes the outermost shell which has 8 electrons in it. Thus, potassium attains a complete electron octet.
 - On loss of electron, the number of electrons in potassium becomes 18. Therefore, the total positive charge of +19 on potassium nucleus is imbalanced. Thus, a K^+ cation which carries net positive charge +1 is formed.
 - Similarly, fluorine gains one electron to complete its octet in L-shell. However, the charge is imbalanced on fluorine nucleus. Thus, a F^- anion which carries net negative charge -1 is formed.
 - When elements of potassium and fluorine combine, a potassium atom gives its valence electron to a fluorine atom. In the process, K^+ cation and F^- anion are formed.
 - These oppositely charged cations and anions are attracted by electrostatic force of attraction resulting in the formation of chemical bond which is also called ionic bond or electrovalent bond.
 - The diagrammatic representation for the formation of K^+F^- from $_{19}\text{K}$ and $_{9}\text{F}$ is as follows:



- 4** Show with the help of diagram of electronic configuration how the following compound are formed from the constituent atoms.

Water

- Ans**
- An atom of oxygen contains six electrons in its valence shell and it needs two electrons to complete the electrons octet. Therefore, valency of oxygen atom is two.
 - An atom of hydrogen contains only one electron and it needs only one electron to complete its electron duplet. Therefore, valency of hydrogen atom is one.
 - The oxygen atom completes its octet by sharing two electrons with two hydrogen atoms. Also, each of two hydrogen atoms completes its electron duplet.
 - This result in the formation of two covalent bonds.
 - The diagrammatic representation for the formation of water molecule (H_2O) is as follows:

