

St. Andrews Scots Sr. Sec. School

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Session: 2022-2023

Subject: Science

Class: VII L-6: Chemicals and Chemical Changes Topic: Ques/Ans

CHECK POINT 1 (Page-64)

1. Fill in the blanks.

- a) Mud is a mixture of soil and water.
- b) Atom is the smallest unit of any chemical element.
- c) Substances can be classified into two types: elements and compounds.
- d) A chemical that combines two or more elements is called a compound.
- e) The chemical formula of water is H₂O.

2. How many elements are found in nature?

Ans) The scientists have discovered about 118 elements so far. Out of these, 98 elements are found on the Earth's surface and the rest can be synthesised in a laboratory.

3. What do you mean by a compound?

Ans) A substance that is formed by the combination of two or more elements is called a compound. Though there are about 118 elements only, millions of compounds can be formed from these elements.

4. What is the use of a chemical formula?

Ans) A chemical formula is used to describe the types of atoms and their numbers in an element or a compound. For example, 'H' represents one atom of hydrogen and 'O' represents one atom of oxygen. If we want to represent two atoms of hydrogen, instead of writing HH, we write H₂. The subscript '2' means that two atoms of the element hydrogen have joined together to form a molecule.

5. State the chemical formulae of table salt and vinegar.

Ans) The chemical formula of table salt is : NaCl

The chemical formula of vinegar is : CH₃COOH

CHECK POINT - 2 (Page 69)

1. Fill in the blanks.

- a) Precipitate is the insoluble substance of a solution.
- b) The reactions in which energy is released are called exothermic reactions.

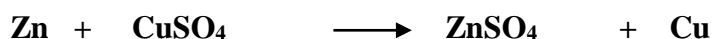
- c) The reactions in which heat is absorbed are called **endothermic** reactions.
- d) The temperature at which boiling happens is called **boiling point**.
- e) The process of forming crystal of a solid from its solution is called **crystallisation**.

2. What do you mean by displacement reaction? Give one example.

Ans) The chemical reaction in which an element replaces another element in a compound is called a displacement reaction.

For example - On reacting zinc with copper sulphate, we get copper and zinc sulphate. Here, zinc, being more reactive than copper, replaces copper from copper sulphate.

Zinc + Copper sulphate \longrightarrow Zinc sulphate + Copper



3. Differentiate between reactants and products.

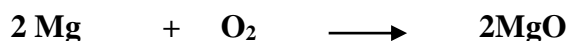
Ans) The changes in which new substances with different properties are formed are called chemical changes. In a chemical change or reaction, the interacting substances are called **reactants**. The new substances that are formed as a result of the chemical change are called **products**.

4. What is a combination reaction?

Ans) The chemical reaction in which two or more simple substances (reactants) combine to form a complex compound is called a combination reaction.

For example - Burning of magnesium ribbons in the presence of oxygen (air) is an example of a combination reaction. Magnesium oxide is the product of this reaction.

Magnesium + Oxygen \longrightarrow Magnesium oxide



5. What is galvanisation?

Ans) Galvanisation is a process in which layer of metals like chromium or zinc are deposited on the iron surface to protect iron from rusting. The body of water coolers used in our house is made of galvanised iron.

EXERCISES (PAGE-70)

A. Choose the correct answer.

1. The smallest unit of any chemical element is called _____.

- a) **atom** b) molecule c) element d) compound

2. Reaction in which heat is absorbed is called _____.

- a) exothermic **b) endothermic** c) precipitation d) combination

3. Converting iron surface with zinc is called _____.

- a) galvanisation** b) crystallisation c) precipitation d) carbonation

4. The chemical symbol of carbon is _____.

- a) Ca b) Co c) **C** d) Cr

5. The purest solid form of a substance with a definite geometrical shape is called _____.

- a) boiling point b) **crystal** c) galvanisation d) atom

B. Name the following.

1. The elements present in hydrochloric acid.

Ans) Hydrogen and Chlorine

2. Atoms present in one molecule of water.

Ans) Two atoms of Hydrogen and One atom of Oxygen.

3. The symbol of lead element.

Ans) The symbol of lead element is **Pb**.

4. Gas obtained when calcium carbonate is heated.

Ans) Carbon Dioxide

5. Any material with a specific chemical composition.

Ans) Chemical substance

6. The smallest unit of any chemical element.

Ans) Atom

7. Reaction in which heat is absorbed.

Ans) Endothermic reaction

8. The simplest unit of a chemical compound.

Ans) Molecule

9. The process of forming crystal of a solid substance from its solution.

Ans) Crystallisation

C. Short answer questions.

1. What do you mean by a chemical substance? Name its two types.

Ans) Any material with a specific chemical composition is called a chemical substance. There are two types of substances, namely, pure substances and mixtures.

2. How do you write the chemical formula of a compound?

Ans) A chemical formula describes the types of atoms and their numbers in an element or a compound. For example, 'H' represents one atom of hydrogen and 'O' represents one atom of oxygen. If we want to represent two atoms of hydrogen, instead of writing HH, we write

H₂. The subscript '2' means that two atoms of the element hydrogen have joined together to form a molecule. A subscript is only used when more than one atom is being represented. Two atoms of hydrogen and one atom of oxygen combine to form a water molecule. Therefore, H₂O is the chemical formula for water.

3. What are the favourable conditions for rusting?

Ans) The chemical name of rust is iron oxide which is formed from the reaction of air and water on iron. Oxygen and water are the two essential conditions for rusting.

This is a chemical change because rusting is permanent.



4. Differentiate between combination reaction and decomposition reaction.

Ans)

COMBINATION REACTION	DECOMPOSITION REACTION
1)The chemical reaction in which two or more simple substances (reactants) combine to form a complex compound is called a combination reaction.	1)A reaction in which a compound breaks down into two or more simple substances is called a decomposition reaction. These reactions require energy which is given in the form of heat and electricity.
2)The burning of magnesium ribbons in the presence of oxygen (air) is an example of combination reaction. Magnesium oxide is the product of this reaction.	2)For example, when you heat up lime to a certain temperature, it produces calcium oxide or quick lime and carbon dioxide.

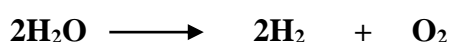
5. Differentiate between endothermic and exothermic reactions.

Ans)

ENDOTHERMIC REACTION	EXOTHERMIC REACTION
1)The reactions in which energy is released are called exothermic reactions.	1)The reactions in which energy is absorbed are called endothermic reactions.
2)For example - formation of water from hydrogen and oxygen is an exothermic reaction.	2)For example - the dissolution of ammonium chloride in water is an endothermic reaction.

6. Give an example of decomposition reaction.

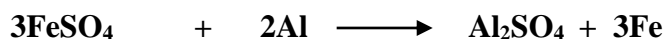
Ans) An example of a decomposition reaction is the process of electrolysis. When current is passed through water, it gives off its constituent elements, i.e., hydrogen and oxygen in their gaseous states. This process is called electrolysis.



7. Give an example of displacement reaction.

Ans) An example of a displacement reaction is the reaction between aluminium and iron sulphate. Aluminium, being more reactive than iron, replaces iron from iron sulphate solution and forms aluminium sulphate.

Iron sulphate + Aluminium \longrightarrow Aluminium sulphate + Iron



8. What is Barrier protection?

Ans) Iron surface can be coated with layers of oil, grease or paint which prevents exposure of iron to air and water. This protects iron from rusting. This kind of protection is called barrier protection.

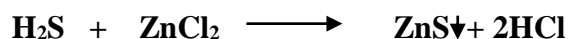
9. How can we obtain crystals of copper sulphate?

Ans) Crystals of copper sulphate can be obtained by preparing its solution in which no more copper sulphate can be dissolved. Heat the solution and leave it overnight. Next morning, you will find beautiful blue crystals of copper sulphate separated out at the bottom of the solution.

10. How do you prepare hydrochloric acid?

Ans) When hydrogen sulphide gas is passed through zinc chloride solution, hydrochloric acid is formed and black coloured zinc sulphide precipitates out. If we filter out the precipitate, we can obtain hydrochloric acid from the product solution.

Hydrogen sulphide + Zinc chloride \longrightarrow Zinc sulphide + Hydrochloric acid



11. In chemistry, what are reactants and products?

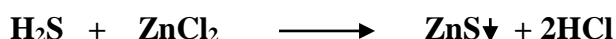
Ans) The changes in which new substances with different properties are formed are called chemical changes. In a chemical change or reaction, the interacting substances are called **reactants**. The new substances that are formed as a result of a chemical change are called **products**.

D. Long answer questions.

1. Explain precipitation reaction with suitable examples.

Ans) There are some chemical reactions that lead to the formation of an insoluble substance that settles down at the bottom of the test tube. This insoluble substance is called precipitate and such reactions are called precipitation reactions. A precipitate is represented by a downward arrow (\downarrow). **For example**, when hydrogen sulphide gas is passed through zinc chloride solution, hydrochloric acid is formed and black coloured zinc sulphide precipitates out.

Hydrogen sulphide + Zinc chloride \longrightarrow Zinc sulphide + Hydrochloric acid



2. Give the chemical formula of following compounds.

a) Vinegar b) Sugar c) Table salt d) Carbon dioxide

Ans) a) Vinegar: CH_3COOH b) Sugar: $\text{C}_6\text{H}_{12}\text{O}_6$
c) Table salt: NaCl d) Carbon dioxide: CO_2

3. What does a chemical formula represent? Explain with suitable examples.

Ans) The basic unit of a compound is a molecule which contains atoms of its constituent elements. A chemical formula is used to describe the types of atoms and their numbers in an element or a compound. For example, 'H' represents one atom of hydrogen and 'O' represents one atom of oxygen. If we want to represent two atoms of hydrogen, instead of writing HH, we write H_2 . The subscript '2' means that two atoms of the element hydrogen have joined together to form a molecule. A subscript is only used when more than one atom is being represented. Two atoms of hydrogen and one atom of oxygen combine to form water molecule. Therefore, H_2O is the chemical formula for water.

4. Complete the following:

- a) Water electrolysis \longrightarrow
b) Magnesium + Oxygen \longrightarrow
c) Iron + Water + Air \longrightarrow

Ans) a. Water electrolysis \longrightarrow Hydrogen + Oxygen
b. Magnesium + Oxygen \longrightarrow Magnesium oxide
c. Iron + Water + Air \longrightarrow Iron oxide (rust)

5. With suitable examples, differentiate between exothermic and endothermic reaction.

Ans)

EXOTHERMIC REACTION	ENDOTHERMIC REACTION
1)The reactions in which energy is released are called exothermic reactions.	1)The reactions in which energy is absorbed are called endothermic reactions.
2)For example- formation of water from hydrogen and oxygen is an exothermic reaction.	2)For example- the dissolution of ammonium chloride in water is an endothermic reaction.

6. State the characteristics of chemical reactions.

Ans) All reactions have the following characteristics:

a. **Change in energy:** All reactions are accompanied by energy changes. Energy, usually in the form of heat, is either given out and/or absorbed in a reaction; i.e., a reaction can be exothermic or endothermic.

b. **Change in state:** In many chemical reactions, the physical state of the substance gets changed. For example, when calcium carbonate is heated, it gives off carbon dioxide which is a gas.

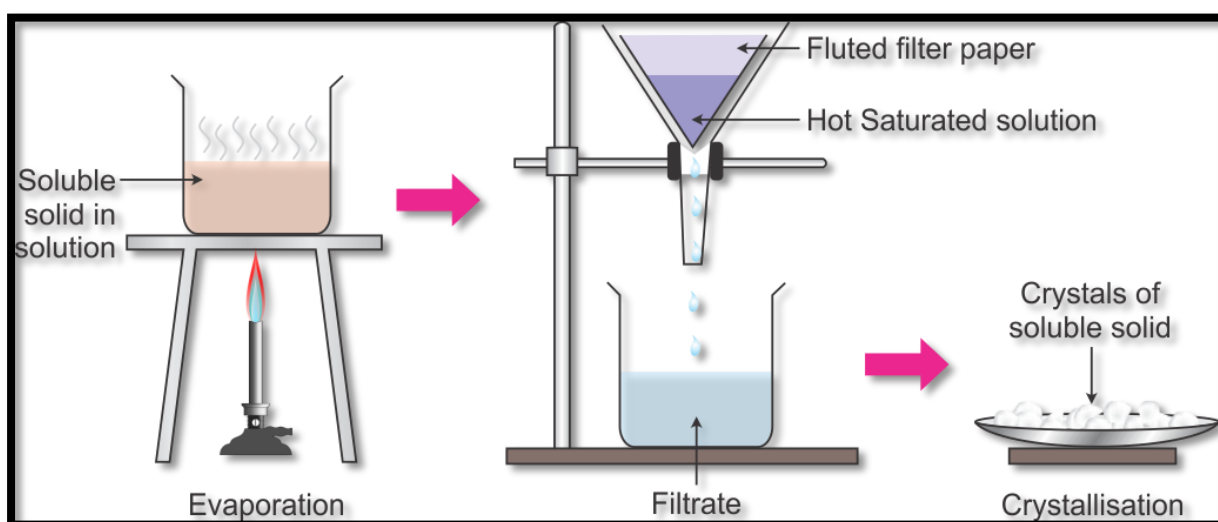
c. **Change in colour:** When a reactant changes to a product, the latter may have a different colour. For example, when zinc powder is added to copper sulphate solution, the blue colour of copper sulphate solution fades away due to the formation of zinc sulphate which is colourless.

d. **Release of gas:** In a chemical reaction, the products formed may be in the gaseous state. If the reactants are in liquid state (solution), the gaseous product is released in the form of bubbles.

e. **Formation of precipitates:** Some chemical reactions lead to the formation of an insoluble substance that settles down at the bottom of the test tube. This insoluble substance is known as a precipitate.

7. Explain the process of crystallisation.

Ans) The process of forming crystals of a solid substance from its solution is known as crystallisation. In order to obtain the crystals of table salt, you can dissolve some salt in boiling water. The more you heat the water, the more the salt dissolves. Dissolve the maximum amount of salt that is possible in the given amount of water. Now filter the solution to remove impurities that are not dissolved in water. Now keep the solution in a cold place and leave it undisturbed for a few hours. You will observe that crystals of salt are formed at the bottom of the solution.



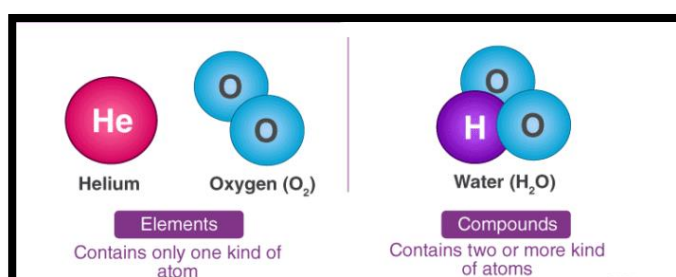
8. Briefly state the process of rusting of iron.

Ans) The reddish-brown layer formed on the iron bolt or iron screw left in open air or in rain is called rust, and the process of its formation is called rusting. The chemical name of rust is iron oxide which is formed from the reaction of air and water on iron. Oxygen and water are the two essential conditions for rusting.

Iron + Oxygen (air) + Water Iron oxide (rust)

The process of rusting becomes faster in humid atmosphere and in saline water.

9. Differentiate between elements and compounds with suitable examples.



Ans)

ELEMENTS	COMPOUNDS
1) A substance which is made up of a particular set of atoms is called an element.	1) A substance that is formed by the combination of two or more elements is called a compound.
2) Scientists have discovered 118 elements so far. An element cannot be broken down into simpler substances.	2) Millions of compounds can be formed by the combination of different elements. If you break down a molecule of a compound, you will get atoms of its constituent elements.
3) For example- iron is an element.	3) For example- hydrochloric acid is made up of hydrogen and chlorine and can be broken down into its constituents.