NCERT Solution

Physical and Chemical Changes

Exercise

1. Classify the changes involved in the following processes as physical or chemical changes:

(a) Photosynthesis

(b) Dissolving sugar in water

(c) Burning of coal

(d) Melting of wax

(e) Beating aluminium to make aluminium foil

(f) Digestion of food

Answer:

Physical changes	Chemical changes
Dissolving sugar in water	Photosynthesis
Melting of wax	Digestion of food
Beating aluminium to make aluminium foil	Burning of coal

2. State whether the following statements are true or false. In case a statement is false, write the corrected statement in your notebook.

(a) Cutting a log of wood into pieces is a chemical change. (True/False)

(b) Formation of manure from leaves is a physical change. (True/False)

(c) Iron pipes coated with zinc do not get rusted easily. (True/False)

(d) Iron and rust are the same substances. (True/False)

(e) Condensation of steam is not a chemical change. (True/False)

Answer:

a) Cutting a log of wood into pieces is a chemical change. (False)

(b) Formation of manure from leaves is a physical change. (False)

(c) Iron pipes coated with zinc do not get rusted easily. (True)

(d) Iron and rust are the same substances. (False)

(e) Condensation of steam is not a chemical change. (True)

3.Fill in the blanks in the following statements:

(a) When carbon dioxide is passed through lime water, it turns milky due to the formation of _____.

(b) The chemical name of baking soda is _____.

(c) Two methods by which rusting of iron can be prevented are _____ and _____.

(d) Changes in which only _____ properties of a substance change are called physical changes.

(e) Changes in which new substances are formed are called _____ changes.

Answer:

(a) When carbon dioxide is passed through lime water, it turns milky due to the formation of **calcium carbonate ($CaCO_3$).**

(b) The chemical name of baking soda is **sodium bicarbonate ($NaHCO_3$).**

(c) Two methods by which rusting of iron can be prevented are **painting** and **galvanization**.

(d) Changes in which only **physical** properties of a substance change are called physical changes.

(e) Changes in which new substances are formed are called **chemical** changes.

4. When baking soda is mixed with lemon juice, bubbles are formed with the evolution of a gas. What type of change is it? Explain.

Answer:

It is a chemical change as citric acid present in lemon juice combines with baking soda (Sodium hydrogen carbonate) to form sodium citrate, carbon oxide and water.

$C_6H_8O_7 + 3NaHCO_3 \rightarrow Na_2C_6H_6O_7 + 3CO_2 + 3H_2O$

5. **When a candle burns, both physical and chemical changes take place. Identify these changes. Give another example of a familiar process in which both the chemical and physical changes take place.**

Answer:

Physical changes in burning candle:

- The wax near the wick melts from solid to liquid state due to heat.
- The melted liquid wax as it flow down, turns back into solid wax again on cooling.

Chemical Changes in burning candle:

In the burning process wax (hydrocarbon) combines with oxygen and gets converted into new substances like carbon dioxide (CO_2) , carbon mono oxide(CO), Carbon (C) soot, and water vapour (H_2O) along with generation of heat and light.

Cooking of food on gas stove is an example of a familiar process in which both the chemical and physical changes take place.

6. How would you show that setting of curd is a chemical change?

Answer:

The setting of milk into curd is an example of chemical change as new substance are formed which has different taste, form, properties and cannot be converted back to the original form. Also apart from solid pieces cheese resulting from the left behind liquid called milk plasma has chemical properties different from milk.

7. **Explain why burning of wood and cutting it into small pieces are considered as two different types of changes.**

Answer:

Burning of wood is an example of chemical changes as a new substance is formed CO_2 and along with heat is produced. Whereas cutting of wood into small pieces is merely a physical change as it does not result into making a new substance with different chemical properties.

8. Describe how crystals of copper sulphate are prepared.

Answer:

Take some amount of water in a beaker and add a few drops of dilute sulphuric acid. Heat the water. When it starts boiling add copper sulphate powder slowly with continuously stirring. Continue adding copper sulphate powder till no more powder can be dissolved. Filter the solution. Allow it to cool. Do not disturb the solution when it is cooling. Look at the solution after some time. In the bottom of beaker we observe the deposition of solid crystals of copper sulphate.

9. Explain how painting of an iron gate prevents it from rusting.

Answer:

For rusting, the presence of both oxygen and water (or water vapour) is essential. In fact, if the content of moisture in air is high, which means if it is more humid, rusting becomes faster. Therefore painting of an iron gate prevents iron from coming in contact with oxygen, or water, or both hence prevent it from rusting.

10. Explain why rusting of iron objects is faster in coastal areas than in deserts.

Answer:

The content of moisture in air is high in coastal areas whereas air is almost dry in desert. For rusting, the presence of both oxygen and water (or water vapour) is essential. If the content of moisture in air (humidity) is high then rusting becomes faster, Hence, the rusting of iron objects is faster in coastal areas than in deserts.

11. The gas we use in the kitchen is called liquified petroleum gas (LPG). In the cylinder it exist as a liquid. When it comes out from the cylinder it becomes a gas (Change – A) then it burns (Change – B). The following statements pertain to these changes. Choose the correct one.

(i) Process – A is a chemical change.

(ii) Process – B is a chemical change.

(iii) Both processes A and B are chemical changes.

(iv) None of these processes is a chemical change.

Answer :

(i) Both processes A and B are chemical changes.

12. Anaerobic bacteria digest animal waste and produce biogas (Change – A). The biogas is then burnt as fuel (Change – B). The following statements pertain to these changes. Choose the correct one.

(i) Process – A is a chemical change.

(ii) Process – B is a chemical change.

(iii) Both processes A and B are chemical changes.

(iv) None of these processes is a chemical change.

Answer :

(iii) Both processes A and B are chemical changes.