# Chapter 6. Physical and Chemical Changes

## Very Short Q&A:

**Q1:** What is rust?

**Ans:** When iron oxide is hydrated, it is known as Rust($Fe_2O_3. XH_2O$)

**Q2:** What type of change in rust?

**Ans:** Chemical change

**Q3:** What type of change is photosynthesis?

**Ans:** Chemical change

**Q4:** What is a chemical change?

**Ans:** A change, in which a new substance with different properties is formed, is known as a chemical change.

**Q5:** A change, in which a new substance with different properties is formed, is known as a _____.

**Ans:** Chemical change

**Q6:** _____is a property by virtue of which a metal can be beaten into thin sheets without breaking.

**Ans:** Malleability

**Q7:** Write the chemical formula of blue vitriol.

**Ans:** Crystals of copper sulphate pent hydrate ($CuSO_4.5H_2O$) are blue in colour. So, it is commonly known as blue vitriol.

**Q8:** State the two important conditions for rusting.

**Ans:** Presence of water and presence of oxygen

**Q9:** What is freezing point of water?

**Ans:** The freezing point is 0 °C at which water freezes.

**Q10:** What is freezing of water?

**Ans:** Freezing is the process in which water turns to ice when cold enough (below 0 °C temperature).

**Q11:** What is melting?

**Ans:** Melting is the process of turning a solid to a liquid.

**Q12:** Name the process by which water molecules continuously change to vapour.

**Ans:** Evaporation

**Q13:** At what temperature water evaporates?

**Ans:** 100 °C

**Q14:** What is the boiling point of water?

**Ans:** 100 °C

**Q15:** In physical change a new substance is formed. True/False.

**Ans:** False

**Q16:** Extraction of metal is a chemical process or physical process?

**Ans:** Chemical process

**Q17:** A medicine is the end product of the chain of _____.

**Ans:** Chemical reaction

**Q18:** Sound may be produced during a chemical reaction yes or no?

**Ans:** Yes

**Q19:** During a chemical reaction

**Ans:** All of these

**Q20:** Heat, light or any other radiation like UV rays may be given off or absorbed during a physical change True/False.

**Ans:** False

**Q21:** Iron pipes coated with zinc do not get rusted easily. True/False.

**Ans:** True

**Q22:** Condensation of steam is chemical process or physical change?

**Ans:** physical change

**Q23:** Cutting of log of wood into pieces is a chemical process or physical change?

**Ans:** physical change

**Q24:** Name the two methods by which rusting of iron can be prevented.

**Ans:** By painting or greasing and by galvanizing with chromium or zinc

**Q25:** Setting of curd is a _____ process.

**Ans:** Chemical

**Q26:** Give an example of chemical change in which heat, light, sound and unpleasant gases are produced.

**Ans:** Explosion of a firework

**Q27:** Digestion is a _____ change.

**Ans:** Chemical

**Q28:** Spoiling of food is a _____ change.

**Ans:** Chemical

**Q29:** Which of the two is permanent change chemical change or physical change?

**Ans:** Chemical change

**Q30:** Define galvanisation.

**Ans:** The process of depositing a layer of zinc on iron is called galvanisation.

**Q31:** Name the metals involved in making stainless steel.

**Ans:** Chromium, nickel and manganese.

**Q32:** What kind of change involved in burning of coal?

**Ans:** Chemical change

**Q33:** Formation of manure from leave is a physical change. True/False

**Ans:** False

**Q34:** Write down the equation representing the process of rusting.

**Ans:** Iron(Fe) + oxygen (O2)->water (H2O) + rust (iron oxide Fe2O3)

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## Short Q&A:

**Q1:** Explain physical reaction along with examples.

**Ans:** A change in which a substance undergoes a change in its physical properties is called physical change, physical properties involves shape, size, colour and state of a substance. It is generally reversible; in physical change no new substance is formed. For example: evaporation, condensation etc.

**Q2:** Explain chemical reaction along with examples.

**Ans:** A change in which one or more new substances are formed is called chemical change. Chemical change is irreversible. It is also called chemical reaction; in this type of change a new substance is formed. Example—Burning of coal, photosynthesis

**Q3:** Differentiate between physical and chemical reactions.

**Ans:** The difference between physical change and chemical change is as follows-Physical change

1. No new substance is formed. A substance undergoes a change in its physical properties.
2. Physical change is generally reversible.

Example—Melting of ice, lighting of bulb Chemical Change

1. One or more new substances are formed by chemical reaction.
2. Chemical change is irreversible.

Example—burning of coal, photosynthesis

**Q4:** State the condition necessary for the occurrence of any reactant.

**Ans:** For the occurrence of any reaction, the molecules or atoms of the reactants must collide with one another, in order to break old bonds and form new bonds.

**Q5:** State rate of chemical reaction.

**Ans:** The speed with which the chemical reaction takes place is called the rate of the chemical reaction.

**Q6:** Why new products are formed in a chemical reaction?

**Ans:** In a chemical reaction the old bonds of the reactants are break down and fresh bonds are formed, resulting in formation of new product with different properties of that of earlier products.

**Q7:** Explain the process of rusting.

**Ans:** When a piece of iron is left in open for some time, it acquires a film of brownish substance called rust. The process is known as rusting.

Iron (Fe) + Oxygen ($O_2$, from the air) + water ($H_2O$)→ Rust (iron oxide) ($Fe_2O_3.H_2O$)
Both Oxygen and water or water vapours are essential for the process of rusting.

**Q8:** How can we prevent rusting?

**Ans:** We can prevent rusting by following methods:

1. By painting or greasing: - by applying a coat of paint or grease regularly on iron articles.

Example—burning of coal, photosynthesis

1. By galvanizing:- Depositing a layer of zinc or chromium on iron. The process is known as galvanization.

**Q9:** Setting of curd is regarded as a chemical change, explain why?

**Ans:** Curd is formed by adding some sour substance to milk and keeping it undisturbed for some hours. Some useful bacteria help in the setting of curd. Curd cannot be converted into milk. It is a different substance than milk. Hence, formation of curd is a chemical change.

**Q10:** What happens when baking soda is treated with vinegar?

**Ans:** Ethanoic acid reacts with sodium hydrogen carbonate to evolve brisk effervescence of carbon dioxide. The equation for the reaction is as follow:

1. $CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + CO_2 + H_2O$

**Q11:** Which one is better technique to obtain sugar from sugar solution- crystallization or evaporation to dryness?

**Ans:** Crystallization is a better technique than evaporation because it has no dissolve impurities that may left in evaporation. So Salt obtain from evaporation is mixed in boiled water . Then solution is filtered to remove dissolved impurities. The filtrate is left undisturbed for few hours. Sodium chloride aggregate and forms pure crystal of salt.

**Q12:** What happens when magnesium oxide is dissolved in water?

**Ans:** When magnesium oxide is dissolved in water, magnesium hydroxide is formed. The equation for the reaction is as follow:

$MgO + H_2O \rightarrow Mg(OH)_2$

**Q13:** What happens when a piece of iron metal is placed in copper sulphate solution?

**Ans:** A more reactive element displaces a less reactive element from its compound. For example when a piece of iron metal is placed in copper sulphate solution, then iron sulphate solution and copper metal is formed. Iron acquire reddish brown colour that deposit is copper.

**Q14:** Explain the changes occuring in burning of candle.

**Ans:** When a candle burns, both physical and chemical changes take place. On burning candle, the wax melts but can be solidified again on cooling. This shows that melting of wax is a physical change. Burning of candle also produces light and some gases like carbon dioxide. Hence, burning of wick of the candle is a chemical change.

**Q15:** Baking soda is mixed with lemon juice, bubbles are formed with the evolution of gas, explain the changes occurred here.

**Ans:** When Baking soda is mixed with lemon juice a chemical change occurs, in this reaction new substance is formed that is carbon dioxide along with the evolution of heat. This is an irreversible reaction. The equation for the reaction is as follow:

Sodium Bicarbonate + Citric acid -> Sodium Citrate + carbon Dioxide + Water + Heat

**Q16:** Name some of the process in which both chemical and physical changes take place.

**Ans:** Cooking of food and hard boiling of egg, in both the process both chemical and physical changes occur. In both cases physical appearance of the substances change and new substances are formed.

**Q17:** Explain why burning of wood and cutting it into small pieces are considered as two different types of changes.

**Ans:** Wood burns and reduces to form a new substance like ash, (carbon), Carbon Dioxide gas, water vapours, heat and light; this kind of change is irreversible. But the cutting of wood into smaller pieces is a physical change becausethe original composition of the wood does not change and no new substance is formed here.

**Q18:** Explain the formation of crystal of copper sulphate.

**Ans:** Take a clean beaker (250 ml) and put the powdered impure sample of copper sulphate in it.

- Add distilled water and stir the contents gently with the help of a glass rod.
- In order to make the solution more clear add two or three drops of concentrated sulphuric acid in it.
- Heat the solution in the beaker to 60-70° c on a wire gauze.
- Stir it continuously and add more impure copper sulphate until no more of it dissolves.
- Filter the solution and collect the filtrate in a china dish.
- Place the china dish over wire gauze kept over a tripod stand and heat it gently (do not boil).
- As the solution gets heated, stir it with a glass rod. This helps in uniform evaporation and prevents the formation of a solid crust.
- When the volume of the solution is reduced to one-half, take out a drop of the concentrated solution on one end of the glass rod and cool it by blowing air. Formation of thin crust indicates that crystallization point is reached.
- Turn off the burner, cover the dish with a watch glass, and keep it undisturbed. As the solution cools down, crystals separate out. Slow cooling ensures better

crystallization.
- Decant the mother liquor and wash the crystals with a thin stream of cold water with the help of a wash bottle.
- Dry the crystals by pressing them gently between sheets of filter paper.

**Q19:** Explain how painting of an iron rod prevents it from rusting.

**Ans:** For rusting the presence of both oxygen and water or water vapour is required. The coat of the paint prevents direct contact of iron with air and oxygen and thus prevents it from rusting.

**Q20:** Explain how painting of an iron articles prevents it from rusting.

**Ans:** For rusting the presence of both oxygen and water or water vapour is required. The coat of the paint prevents direct contact of iron with air and oxygen and thus prevents it from rusting.

**Q21:** Rusting of an iron object is faster is coastal areas than in desert area. Explain why?

**Ans:** For rusting the presence of both oxygen and water or water vapour is must, in coastal region the content of moisture in air is high whereas in desert region the content of moisture in air is low and thus rusting becomes faster in coastal region.

**Q22:** A part from new products, many other things accompany a chemical change, what are those things?

**Ans:** A part from new products, many other things accompany a chemical change, those things are :

- Heat, light or any other radiation may be given off or absorbed.
- Change in smell may take place
- Sound may be produced
- Change in colour may take place
- A gas may be formed

**Q23:** Why chemical changes are very important in our life?

**Ans:** A change in which the composition of a substance is altered is called as chemical change. As a result, the original properties get changed and one or more new substances are formed. Burning of paper, rusting of iron, cooking of food. All new substances are formed as a result of chemical reactions , a medicine is the end product of the chain of chemical reaction, photosynthesis , digestion is the chemical reaction, useful materials like

plastics, detergents and many more products are formed by chemical reactions only, thus we can say chemical changes are very important in our life.

**Q24:** Burning of any substance is the chemical change. Discuss.

**Ans:** In burning always heat is produced, the old bonds of the reactants are break down and fresh bonds are formed, resulting in formation of new product with different properties of that of earlier products. For details refer Section B answer no 22 and 23.

**Q25:** Why spoiled food produces foul smell?

**Ans:** Spoiled food produces foul smell because of the chemical reaction occurred in it which alter the composition of substance, the old bonds of the reactants are break down and fresh bonds are formed, resulting in formation of new product with different properties of that of earlier products.

**Q26:** A slice of apple acquires a brown colour if it is not consumed immediately, explain.

**Ans:** Spoiled food produces foul smell because of the chemical reaction occurred in it which alter the composition of substance, the old bonds of the reactants are break down and fresh bonds are formed, resulting in formation of new product with different properties of that of earlier products.

**Q27:** State Four characteristics which are included in the physical properties of matter.

**Ans:** Properties such as shape, size, colour and state of a substance are called its physical properties.

**Q28:** Define malleability along with an example.

**Ans:** Malleability is a property by virtue of which a metal can be beaten into thin sheets without breaking. Malleability is the ability of a metal to be hammered into thin sheets. Gold and silver are highly malleable. When a piece of hot iron is hammered it takes the shape of a sheet.

**Q29:** Why formation of manure from leave is a chemical change?

**Ans:** Formation of manure from leave is a chemical change because the manure formed has different composition from the leaves.

**Q30:** Why cutting of wood is a chemical change?

**Ans:** Cutting of wood is a physical change because the identity and composition of wood does not changes.

## Long Q&A:

**Q1:** Explain the physical and chemical processes along with examples.

**Ans:**

A change in which a substance undergoes a change in its physical properties is called physical change, physical properties involves shape, size, colour and state of a substance. It is generally reversible; in physical change no new substance is formed. For example: evaporation, condensation etc.

A change in which one or more new substances are formed is called chemical change. Chemical change is irreversible. It is also called chemical reaction; in this type of change a new substance is formed. Example—Burning of coal, photosynthesis

The difference between physical change and chemical change is as follows-Physical change
(1) No new substance is formed. A substance undergoes a change in its physical properties.
(2) Physical change is generally reversible.
Example—Melting of ice, lighting of bulb Chemical Change
(1) One or more new substances are formed by chemical reaction.
(2) Chemical change is irreversible.
Example—burning of coal, photosynthesis

**Q2:** Explain the process of rusting of iron, and measures to prevent the same.

**Ans:**

When a piece of iron is left in open for some time, it acquires a film of brownish substance called rust. The process is known as rusting.

Iron (Fe) + Oxygen ($O_2$, from the air) + water ($H_2O$)→ Rust (iron oxide) ($Fe_2O_3.H_2O$)

Both Oxygen and water or water vapours are essential for the process of rusting.

We can prevent rusting by following methods:

a. By painting or greasing: - by applying a coat of paint or grease regularly on iron articles.
b. By galvanizing:- Depositing a layer of zinc or chromium on iron. The process is known as galvanization.

**Q3:** Explain the following:

a. Galvanisation

b. Crystallisation

**Ans:**

a. Depositing a layer of zinc or chromium on iron to prevent it from rusting is known as galvanization. Doing this prevents direct contact of iron with air and oxygen and thus prevents it from rusting.
b. Some substances can be obtained in pure state from their solutions by the process of crystallisation