F. Answer the following question in brief?

Q1. You forget a toast in toaster and it turns black. Can this change be reversed?

Answer: A toast kept in a toaster becomes black. This is an irreversible change.

Explanation: Any change that cannot be reversed is called an irreversible change and it is a permanent change

Q2. You blow dry your wet hair how can you reverse this change?

Answer: We can reverse the change by washing the hair so that it becomes wet again. Blowing dry wet hair is an example of physical change because no new substance is formed and it can be reversed by reversing the situation.

Q3. Why is cooking of food an irreversible change?

Answer: The cooking of food is an irreversible change as the ingredients used in the cooking of food cannot be obtained back. For example - it is impossible to turn a boiled or cooked egg into a raw egg.

Q4. Give an example of physical change that can't be reversed.

Answer: Many physical changes can be reversed, like water freezing to form ice. But some physical changes cannot, such as an egg being cracked or wood being ground into sawdust.

The changes which cannot be reversed are following: Souring of milk. Burning of paper. Digestion of food.

Q5. What kind of change is observed when copper utensils appear to be greenish in colour?

Answer: The greenish coating appears when copper utensils are exposed to air. The copper utensils turn green in colour when exposed to air and this is due to corrosion. After cleaning greenish colour disappears. Hence it's reversible change.

Q6. Which of following changes can be reversed: grain to flour, bud to flower, melting of ghee and ripening of fruits.

Answer: Melting of ghee is a reversible change because on melting, ghee turns into liquid form and after cooling it returns to its original form.

Q7. Define the following:

A. Reversible Change B. Physical change C. Irreversible change D. Chemical change

Answer:

Reversible Change: A reversible change is a change that can be undone or reversed. These changes are observed in the physical state, size and shape of the substance. A reversible change does not create a new material. Example - A blacksmith changes a piece of iron into different tools.

Physical change: Physical change is a change in which no new substance is formed. During a physical change, only the physical properties of the substances are changed. The chemical composition is not affected by physical changes. Examples: dissolving sugar in water, sublimation of dry ice, crushing a paper, melting wax, boiling water, etc.

Irreversible change: A change that cannot happen backward, that is, it cannot be reversed is called an irreversible change. Irreversible changes are permanent. They cannot be undone. For example you cannot change a cake back into its ingredients again.

Chemical Change: The change in which the molecular composition is completely altered and a **new product is formed** is called a chemical change. Chemical changes create a new product. The changes in chemical **change are irreversible and permanent**.

Examples:

1. Burning of wood or paper
2. Burning of camphor
3. Souring of milk
4. Burning of candle
5. Digestion of food

G. Answer the following question in details.

Q1. Explain with the help of an examples, the difference between the changes that can be reversed and those that can't be reversed.

Answer: To explain the differences between changes that can or cannot be reversed, some examples are given below:

(i) If we inflate a balloon, the size and shape of the balloon undergoes a change. However, the original size and shape of the balloon can be obtained back by allowing the air to escape from the balloon. This means that the change that occurs by inflating a balloon can be reversed. But, if the balloon bursts after being inflated, then its original size and shape cannot be obtained back. Thus, in this case, the change cannot be reversed.

(ii) If we fold a piece of paper, then the shape and size of the paper undergoes a change. In this case, the original shape and size of the original paper can be obtained back. Thus, this change can be reversed. However, if we cut the piece of paper, the change in the shape and size of the paper cannot be reversed.

(iii) After we roll out a *chapatti* from a ball of dough, the *chapatti* can be converted back into a ball. Thus, the change occurring here can be reversed. But, if we cook the *chapatti* on a *tawa*, then it cannot be converted back into a ball of dough. Thus, the change is irreversible.

Q2. Explain the type changes involved in a sequence

Ice cube placed in the sun ➔ puddle of water ➔ disappearance of puddle

Answer:

Step 1 / 3 ➔ Ice cube placed in the sun: This is a physical change where ice cube is exposed to heat and starts to melt.

Step 2/3 ➔ Formation of Puddle of water from ice cube is due to melting of the ice. When water melts, it changes from solid state to liquid state; but it is still water; it has not formed any new substance.

Step 3/3 ➔ Disappearance of water in presence of sun is known as vaporisation.

A physical change is one which involves changes in the physical properties of a substance such as a state, shape, size, and colour, etc. No new substances are formed in a physical change. Also, the original substance

can generally be recovered again in a physical change i.e. most physical changes are reversible, as the melting of ice only includes the change in physical properties like state, shape, etc. moreover no new chemical products is formed. Therefore, it is a physical process.

Q3. What are the physical changes? Give two examples.

Answer: Physical changes include transitions from one state to another, such as from solid to liquid or liquid to gas. Cutting, bending, dissolving, freezing, boiling, and melting (**melting**, freezing, vaporization, condensation, sublimation) are some of the processes that create physical changes.

Examples of physical changes include crushing a can, **melting** an ice cube, and breaking a bottle

Q4. What is chemical change? Give two examples of chemical changes.

Answer: Chemical Changes

One or more substances, at times, react with one another or substances which are readily available in the environment. It is the irreversible process. It does permanent changes. This consequently leads to the formation of new substance(s). The formation of the new substance can also be accompanied by one or more of the following:

- Emission of Heat as a result of a Chemical Changes
- Absorption of Heat as a result of a Chemical Changes
- Emission Light as a result of a Chemical Changes
- Production of Sound as a result of a Chemical Changes
- Change or emission of Odour as a result of a Chemical Changes
- Emission of Gas as a result of a Chemical Changes

  and so on.

Examples of Chemical Change

- Rusting of Iron
- Souring of Milk
- Ripening of Fruits
- Digestion of Food
- Bursting of Cracker

Q5. Why is getting a new haircut considered to be a physical changes?

Answer: Getting your haircut is a physical change **because you're not actually changing your hair. It will grow back and it's still hair it** hasn't changed.. A physical change happens when a substance is altered somehow but remains the same substance. It is not chemically changed. For example, when you cut your hair, it is still your hair; you have simply removed some of it. No new substance is formed No energy is give out No energy is taken in.

Q6. What do you observe when fireworks explode? Is anything new formed? What type of change it is?

Answer: The explosion of crackers is a chemical change because the explosive reactants are transformed into gaseous products along with heat and light and thus cannot be reversed.

Hence, it is a chemical change. A chemical change occurs whenever matter changes into an entirely different substance with different chemical properties. A chemical change is a change that is irreversible i.e. original substance cannot be recovered after the change occurs. Also, new substances are formed in a chemical change, with the evolution of energy in some cases.

- The explosion of fireworks such as a cracker releases a lot of energy with the evolution of heat, light, and sound along with the production of gaseous products.
- The original substance cannot be recovered after the explosion occurs, Hence this is a chemical change.

Q7. Why does idli batter rises when kept overnight without refrigeration?

Answer: The dough prepared for making idli rises when kept overnight because of the production of carbon dioxide gas in it. This gas is produced as a by-product of process of fermentation (anaerobic respiration/respiration in absence of oxygen) in batter of black lentils or rice which is used to make idli.

Anaerobic fermentation occurs in the fungus. Fungi break down fermentable carbohydrates into ethanol and carbon dioxide. The dough rises and becomes soft and fluffy as a response to the carbon dioxide gas.

Q8. Squeezing oranges for juice is a physical change. Justify?

Answer: Physical change even though you cannot reverse it. There is no new substance. Squeezing the juice out of the oranges is just moving it from one place to another, there is no change in its properties. When an orange is squeezed then there is no change in the chemical composition of a substance, which means that the chemical composition of the orange after squeezing it remains the same.

Q9. Places such as mountains, where temperature get very low during winters, the plastic pipes meant for water transportation break. Why do you think it happen?

Answer: In the colder countries the water pipes often burst because when the water gets close to freezing it expands inside the pipe, so that it increases the pressure inside the pipe, resulting in solid ice filling more volume compared with the liquid that used to be running through the pipes. That ice creates pressure inside the pipes that can cause a rupture.

In winter, when the temperature starts falling down and reaches 0oC, the density of water drops suddenly. Due to this, pressure is exerted on the walls of the pipe carrying the water because of which the pipe breaks.

Q10. Differentiate between:

(a) Reversible and irreversible change.

Reversible Process	Irreversible Process
A process that can be reversed is called reversible process.	A process that cannot be changed is called an irreversible process.

A reversible process is temporary.	An irreversible process is permanent.
No new substance is formed.	New substances are formed.
Dissolving, melting, and folding is examples of a reversible process.	The burning of a substance is an irreversible process.
For example: Melting of ice, Folding of chapati dough.	**For example:** Cooking, Frying, etc.

(b) Physical and Chemical changes

Physical change	Chemical change
Only physical changes like odour, physical state, density, volume etc. changed and chemical properties remain unchanged	The chemical composition and chemical properties undergo a change
No new substance is formed in a physical change.	A new substance is formed in a physical change.
Very little or no energy in the form of heat, light or sound is usually absorbed or given out in a physical change	A chemical change is always accompanied by absorption or evolution of energy
It is a temporary change	It is a permanent change
The original form of substance can be regained by simple physical method	Original substance cannot be obtained by simple physical method
It is reversible	It is irreversible

© Evaporation and Condensation:

Difference between Evaporation and Condensation

Evaporation	**Condensation**
The change of a liquid into vapors at any temperature below its boiling point is called evaporation.	Condensation is the change of the physical state of matter from gas phase into liquid phase.
In this process the state of matter changes from liquid to vapor (gas).	In this process the state of matter changes from gas to liquid.
During this process forces of attraction between particles become low and this is the reason liquid changes into vapor.	During this process forces of attraction between particles become strong and this is the reason gas changes into liquid.
It takes place in low altitudes.	It takes place at higher altitudes.
It is an endothermic process.	It is an exothermic process.

(d) Expansion and Contraction:

The difference between expansion and contraction are as follows:

Expansion	Contraction
1.It is an increase in the size of an a object on heating.	1.It is a decrease in the size of the object on cooling.
2. The particles of matter start moving apart with a gain of energy.	2. The particles of matter start moving closer with the loss of energy.
3. This causes an increase in the volume of the matter.	3. This causes a decrease in the volume of the matter.
4. It leads to a decrease in density.	4. It leads to an increase in density.
5. Expansion is maximum for gases and least for solids.	5. Contraction is maximum in gases and least in solids.

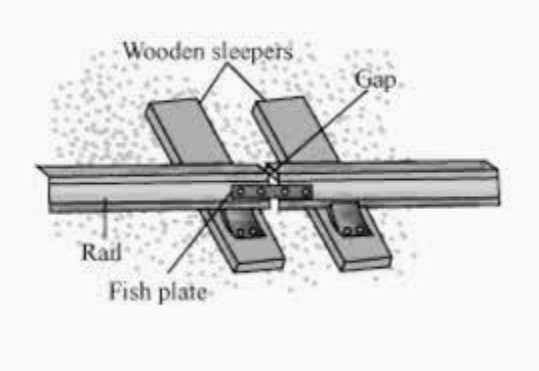
Q11. Look at the following pictures and write down as to whether the changes are reversible or irreversible. For reversible changes, draw a second arrow below the first in the opposite direction?

Answer: An iron nail develops a reddish brown coat when it comes in contact with air and water. This coat is known as rust and the process is known as rusting of iron. We cannot get iron back from this rust. Hence this process is irreversible.

When a melted chocolate is kept in a refrigerator it solidifies on cooling. However when it will be kept at room temperature, it will absorb heat and melt again. Hence, it is a reversible process

Q12. Why are there gaps between sections of rails on the railway track?

Answer: Railway tracks are exposed to various environmental conditions, including temperature fluctuations. Metals, such as steel, expand when heated and contract when cooled. The gaps between rails allow for thermal expansion and contraction, preventing the tracks from buckling or becoming too tight. Without these gaps, the rails would exert excessive pressure on each other, leading to structural damage and potential derailments.



Q13. Why the milk in a saucer pan overflow when heated?

Answer: When milk gets slowly heated up, the fat in the milk being lighter gets to the top, which collects & the inside being hotter than the top surface of the fat film, the film forms a veneer over the boiling milk. In the meantime, the boiling milk produces bubbles, which can't escape to atmosphere, as they are trapped under the fat film, so it comes out of the container.