

NATURE OF MATTER: ELEMENTS, COMPOUNDS AND MIXTURES

Class 08 - Science (Curiosity)

Time Allowed: 1 hour and 30 minutes

Maximum Marks: 140

1. How can pure substances be separated in scientific terms? [1]
 - a) They cannot be separated by any physical process
 - b) By physical means
 - c) By chemical means
 - d) By magnetic means
2. Which of the following is a compound mineral? [1]
 - a) Pyroxene
 - b) Sulfur
 - c) Copper
 - d) Gold
3. Describe the primary materials used in creating Dhokra art. [1]
 - a) Clay and wax
 - b) Paper and glue
 - c) Molten brass or bronze
 - d) Steel and iron
4. Which of the following is considered a pure substance in science? [1]
 - a) Packed fruit juice
 - b) Milk
 - c) Baking soda
 - d) Sugar
5. What term is used to describe the individual substances that make up a mixture? [1]
 - a) Components
 - b) Atoms
 - c) Compounds
 - d) Elements
6. Identify the mixture from the following options. [1]
 - a) Air
 - b) Water
 - c) Iron
 - d) Oxygen
7. Why are chemists concerned with understanding how elements combine? [1]
 - a) To create lightweight materials
 - b) To provide faster computing
 - c) To invent life-saving medicines
 - d) To build stronger structures
8. Which substance in the following list is considered an alloy? [1]
 - a) Milk
 - b) Bronze
 - c) Water
 - d) Glass
9. Which of the following is an example of a mixture? [1]
 - a) Sprout salad
 - b) Salt
 - c) Iron
 - d) Oxygen gas
10. How are the components of non-uniform mixtures usually arranged? [1]

- a) Evenly distributed
b) Randomly scattered
c) Arranged in layers
d) Tightly packed

11. What elements make up the compound water? [1]
a) Iron and aluminium
b) Hydrogen and oxygen
c) Carbon and oxygen
d) Nitrogen and hydrogen

12. Which of the following best describes a mixture? [1]
a) Chemically bonded atoms
b) Uniform composition always
c) Fixed formula
d) Substances physically combined

13. Which mineral is used in the production of cement? [1]
a) Dolomite
b) Calcite
c) Gypsum
d) Aluminum

14. A solution of salt in water is an example of [1]
a) Element
b) Non-uniform mixture
c) Compound
d) Uniform mixture

15. Consider the following reaction where two substances, A and B, combine to form a product C: $A + B \rightarrow C$ [1]
Assume that A and B cannot be broken down into simpler substances by chemical reactions. Based on this information, which of the following statements is correct?
a) C is a compound, and A and B have a fixed composition.
b) A and B are elements, C is a compound, and has a fixed composition.
c) A, B, and C are all compounds and only C has a fixed composition.
d) A and B are compounds, and C has a fixed composition.

16. **Assertion (A):** Milk should be classified as a pure substance. [1]
Reason (R): A pure substance for a scientist consists of the same type of particles only.
a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

17. **Assertion (A):** All elements are substances made of identical atoms. [1]
Reason (R): Elements cannot be separated into simpler substances by chemical means.
a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

18. **Assertion (A):** Mixtures do not have a fixed composition. [1]
Reason (R): The components of the mixture are chemically bonded.
a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.

- c) A is true but R is false. d) A is false but R is true.
19. **Assertion (A):** Mixtures can involve solids, liquids, and gases in various combinations. [1]
Reason (R): Each component of a mixture has distinct visibility in all mixtures.
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false. d) A is false but R is true.
20. **Assertion (A):** Stainless steel is an example of an alloy. [1]
Reason (R): Alloys are mixtures wherein the individual components can be seen separately with the naked eye.
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false. d) A is false but R is true.
21. What is the basic composition of water? [1]
22. What transformation does water undergo when it is heated or cooled? [1]
23. Explain why stainless steel is considered a uniform mixture. [1]
24. Identify the two gases formed when water is electrolyzed in the presence of sulfuric acid. [1]
25. What is the component of a solution that is present in a smaller proportion called? [1]
26. What are the states of water and how do they change with temperature? [1]
27. What type of mixture is Milk of Magnesia? [1]
28. Define the term heterogeneous mixture. [1]
29. Explain why water is classified as a compound and not a mixture. [1]
30. In what way can adulteration harm consumers? [1]
31. How could the discovery of a compound that absorbs carbon dioxide from the air contribute to solving environmental challenges? [2]
32. Define uniform and non-uniform mixtures with appropriate examples from daily life. [2]
33. What new substance is formed when a mixture of iron filings and sulfur powder is heated, and how is it different from the original mixture? Also, write the word equation for the reaction. [2]
34. What is an alloy, and what are some common examples? [2]
35. How can elements be combined to form a compound? [2]
36. Why can't the components of a uniform mixture be seen separately? [2]
37. Why is water called a universal solvent? [2]
38. Water, a compound, has different properties compared to those of the elements oxygen and hydrogen from which it is formed. Justify this statement. [2]
39. Explain the concept of 'mixtures' and provide two examples where mixtures occur naturally. [2]
40. Describe what makes air a mixture and state whether it's uniform or non-uniform. [2]
41. What happens on cooling and heating water and how does it demonstrate the concept of pure substances? [3]
42. Provide an example of a non-uniform mixture and describe how its components are visible. [3]
43. Define minerals and explain how they are classified in terms of their composition. [3]
44. Explain the differences observed when electricity is passed through water and during heating. What does this reveal about water's composition? [3]

45. Define pure substances and differentiate between elements and compounds within pure substances. [3]
46. State the properties of a solution. [3]
47. Explain why certain mixtures appear uniform while others do not. [3]
48. List two examples of alloys and describe what makes them mixtures. [3]
49. Describe how elements differ from compounds, highlighting their properties and examples. [3]
50. Describe how the concept of mixtures can be observed in everyday life. [3]
51. **Read the following text carefully and answer the questions that follow:** [4]

Pure substances are classified as elements and compounds. Elements, like hydrogen, oxygen, gold, and silver, consist of identical atoms and cannot be broken into simpler substances. Compounds, such as water, sugar, and iron sulfide, are formed when elements combine in fixed ratios, producing new substances with distinct properties. Unlike mixtures, compounds cannot be separated by physical methods, and their chemical composition remains constant, regardless of the sample size.

Questions:

1. Give an example of a compound and explain why it is considered a compound. (1)
2. Explain why iron sulfide is classified as a compound. (1)
3. Differentiate between an element and a compound with examples. (2)

OR

Explain why compounds like water cannot be separated into elements by physical methods. (2)

52. **Read the following text carefully and answer the questions that follow:** [4]

A mixture is formed when two or more substances combine without undergoing chemical changes, and each retains its properties. Mixtures can be uniform, where components are evenly distributed like air or sugar in water, or non-uniform, where components are visibly separate like sprout salad or sand in water. Alloys, such as stainless steel or bronze, are uniform solid mixtures. Air itself is a mixture of gases with suspended dust and pollutants.

Questions:

- a. Give an example of a uniform mixture and explain why its components are considered evenly distributed. (1)
- b. Explain why alloys like stainless steel are classified as uniform mixtures. (1)
- c. Differentiate between uniform and non-uniform mixtures with examples. (2)

OR

Why is air considered a mixture, and what are its main components? (2)

53. **Read the following text carefully and answer the questions that follow:** [4]

In everyday life, 'pure' often means unadulterated, like milk or ghee without additives. Adulteration adds cheaper substances, reducing quality and health safety. In science, a pure substance contains only one type of particle and cannot be separated physically into other substances. Even products that appear pure may be mixtures. For example, milk or packed fruit juice are mixtures, while sugar and baking soda are considered pure substances.

Questions:

- a. Give an example of a pure substance and explain why it is classified as pure in science. (1)

- b. Define a pure substance in scientific terms. **(1)**
- c. Explain the difference between 'pure' in everyday life and 'pure' in science. **(2)**

OR

Classify milk, baking soda, sugar, and soil as pure substances or mixtures and justify your answer. **(2)**

54. **Read the following text carefully and answer the questions that follow:** **[4]**

Most rocks are mixtures of minerals, which can be elements or compounds. Native minerals, like gold and sulfur, are pure elements, while others, such as quartz and calcite, are compounds. Minerals are used in everyday materials like cement and talcum powder. Traditional Indian crafts like Dhokra art use metals to create sculptures. Elements and compounds form all matter, but phenomena like light, heat, electricity, and emotions are not matter.

Questions:

- a. Give an example of a native mineral and explain why it is called native. **(1)**
- b. Explain the difference between native minerals and other minerals. **(1)**
- c. Describe the use of minerals in daily life and traditional crafts. **(2)**

OR

Why is it important to distinguish between matter and non-matter? **(2)**

55. **Read the following text carefully and answer the questions that follow:** **[4]**

Elements, compounds, and mixtures are essential in daily life. Air is a mixture of gases, water is a compound of hydrogen and oxygen, and metals like iron and aluminium are used in construction. Understanding these substances enables innovations like medicines, fertilizers, and alloys such as stainless steel. Advanced materials like graphene aerogel, extremely light and porous, are used in environmental cleaning, energy-saving devices, and specialized coatings for buildings.

Questions:

- a. Give an example of a mixture and explain why it is classified as a mixture. **(1)**
- b. Explain why stainless steel is preferred over pure iron in construction. **(1)**
- c. Describe how knowledge of elements and compounds is useful in agriculture and medicine. **(2)**

(2)

OR

Explain the uses of graphene aerogel and why it is considered a 'wonder' material. **(2)**

56. **State whether the given statement is True or False:** **[5]**

- (a) The common usage of 'pure' and scientific usage of 'pure' have the same meaning. **[1]**
- (b) Compounds always have a fixed chemical composition. **[1]**
- (c) Packed fruit juice is classified as a pure substance in scientific terms. **[1]**
- (d) Evaporation is a physical method used to separate salt from water. **[1]**
- (e) A compound can be created from one atom. **[1]**

57. A student is given a mixture of naphthalene balls' powder and common salt. He needs to separate this mixture. How will he do this? **[5]**

58. Write a method to separate different gases from air. **[5]**

59.
 - a. Define solution. **[5]**
 - b. Give different types of solutions with one example each.

60. Give the difference between colloidal solutions and suspensions. [5]
61. Describe the significance of water as a compound and its role in sustaining life and the environment. [5]
62. **Fill in the blanks:** [10]
- (a) Eleven elements exist in a _____ state at room temperature. [1]
 - (b) A mixture contains more than _____ substance mixed in any proportion. [1]
 - (c) A pop sound is heard when a burning candle is brought near a test tube containing _____ gas. [1]
 - (d) In a compound, atoms are bonded together in a definite _____. [1]
 - (e) A solution is defined as a mixture that is _____. [1]
 - (f) Compound has _____ properties than the elements that form it. [1]
 - (g) Two or more elements chemically combined form a _____. [1]
 - (h) The smallest particles that make up all matter are called _____. [1]
 - (i) A combination of substances not chemically bonded is called _____. [1]
 - (j) Sugar and water form a _____ mixture. [1]

USP

Solution
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1. **(a)** They cannot be separated by any physical process
Explanation:
Pure substances cannot be broken into simpler substances by physical methods.
2. **(a)** Pyroxene
Explanation:
Pyroxene is a compound mineral.
3. **(c)** Molten brass or bronze
Explanation:
Dhokra art is created using molten brass or bronze.
4. **(d)** Sugar
Explanation:
Sugar is made up of one type of particle, hence it is pure.
5. **(a)** Components
Explanation:
Components are the individual substances that make up a mixture.
6. **(a)** Air
Explanation:
Air is a mixture of several gases including oxygen, nitrogen, and carbon dioxide.
7. **(c)** To invent life-saving medicines
Explanation:
Chemists study the combination of elements to invent medicines and vaccines, addressing pressing health issues.
8. **(b)** Bronze
Explanation:
Bronze is an alloy made up of copper and tin.
9. **(a)** Sprout salad
Explanation:
Sprout salad is a mixture of green gram, chickpeas, onion, and tomato.
10. **(b)** Randomly scattered
Explanation:
Non-uniform mixtures have components that are not evenly distributed.
11. **(b)** Hydrogen and oxygen
Explanation:
Water is comprised of two hydrogen atoms and one oxygen atom, forming H_2O .

12. **(d)** Substances physically combined
Explanation:
A mixture is formed when two or more substances are physically combined without any chemical reaction. Each substance retains its own properties and can be separated by physical methods.
13. **(b)** Calcite
Explanation:
Cement production involves the use of calcite.
14. **(b)** Non-uniform mixture
Explanation:
A salt solution in water is actually a uniform (homogeneous) mixture, because salt dissolves completely and cannot be seen separately. The correct idea is that it is a homogeneous mixture, not a non-uniform mixture.
15. **(b)** A and B are elements, C is a compound, and has a fixed composition.
Explanation:
This is because elements are simplest substances that cannot be broken down further, and they combine chemically in fixed ratios to form compounds with new properties.
16. **(d)** A is false but R is true.
Explanation:
Milk is a mixture of substances, not a singular type of particle.
17. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation:
Assertion (A) is true because an element is made up of only one kind of atom. Reason (R) is also true because elements cannot be broken down into simpler substances by chemical methods. This inability to break them further explains why they consist of identical atoms, so (R) correctly explains (A).
18. **(c)** A is true but R is false.
Explanation:
Assertion (A) is true because mixtures do not have a fixed composition; the proportion of components can vary. Reason (R) is false because in a mixture, the components are not chemically bonded, they are only physically combined.
19. **(c)** A is true but R is false.
Explanation:
Some mixtures, like air, are uniform and do not have visible distinctions.
20. **(c)** A is true but R is false.
Explanation:
In alloys, components are intermixed uniformly and cannot be seen separately.

21. Water is composed of hydrogen and oxygen in a 2:1 ratio, forming the molecular compound H_2O .
22. Water turns into ice when cooled and becomes vapor when heated; it turns back to liquid water by heating or cooling.
23. Stainless steel is a uniform mixture because its components are mixed evenly, making the entire mixture appear the same throughout.
24. Hydrogen and oxygen gases are formed during the electrolysis of water when sulfuric acid is present.
25. Solute is the component of a solution that is present in a smaller proportion.
26. Water can exist in three states: solid (ice), liquid, and gas (vapor). Cooling liquid water turns it into ice, while heating it turns it into vapor.
27. Milk of Magnesia is a suspension, not a true solution.
28. A mixture where components are not uniformly distributed and properties vary is called heterogeneous.
29. Water is a compound as it has chemically combined hydrogen and oxygen in a fixed ratio, differing from mixtures, where components retain distinct properties.
30. Adulteration can degrade product quality and potentially make consumables hazardous to health, posing risks to consumers.
31.
 - Such a compound could reduce atmospheric carbon dioxide levels, mitigating global warming and climate change.
 - For instance, it might be used in technologies to capture emissions from industries or vehicles, similar to how calcium hydroxide reacts with carbon dioxide to form calcium carbonate.
 - This could help address air pollution and support environmental cleanup efforts.
32. A uniform mixture (homogeneous) has the same composition throughout, like salt dissolved in water or air. A non-uniform mixture (heterogeneous) has visibly different parts, like sand in water or a fruit salad. These differences help classify mixtures in daily life.
33. Iron sulfide (a black compound) is formed. It differs as it has uniform texture, no magnetic attraction (unlike iron in the mixture), and reacts with hydrochloric acid to produce hydrogen sulfide (rotten egg odor), not hydrogen gas like the mixture. Word equation: Iron + Sulfur $\rightarrow$ Iron sulfide.
34. An alloy is a mixture of two or more metals, or a metal combined with a non-metal, made to improve strength, durability, or resistance. Common examples include brass (copper and zinc), bronze (copper and tin), steel (iron and carbon), and solder (lead and tin).
35. A compound is a unique substance that forms when two or more elements combine chemically. Compounds form as a result of chemical reactions. The elements in compounds are held together by chemical bonds.
36. The components of a uniform mixture cannot be seen separately because they are mixed at the molecular or particle level. The particles are evenly distributed and too small to be distinguished by the naked eye, giving the mixture a single, uniform appearance.
37. Water is called a universal solvent because:
- It can dissolve a wide variety of substances due to its polar nature, which allows different molecules to interact with it effectively.
 - Example: In our body, water dissolves salts, sugars, and gases to help with digestion, transport, and cell functions.
38.
 - Water is formed by hydrogen and oxygen combining in a 2:1 ratio through a chemical reaction.
 - Hydrogen is a flammable gas, oxygen supports combustion, but water is a liquid that extinguishes fire.
 - This shows compounds have properties distinct from their constituent elements, where water decomposes into hydrogen and oxygen via electrolysis.
39. Mixtures consist of two or more substances blended without chemical bonding. Examples include air, a mixture of gases, and seawater, a mixture of water and salts.
40. Air is a mixture because it contains different gases like nitrogen, oxygen, carbon dioxide, and small amounts of other gases, dust, and water vapor physically combined without chemical bonding. Since these gases are evenly distributed under normal conditions, air is considered a uniform (homogeneous) mixture.

41. On cooling, water becomes ice and on heating, it turns into vapor. These changes show that the particles remain the same throughout these transitions, thus demonstrating that water is a pure substance, as it retains its original particles and identity during physical changes.
42. A sprout salad consisting of green gram, chickpeas, onion, and tomato is an example of a non-uniform mixture. In this mixture, the different components maintain their distinct characteristics, and each ingredient is visibly discernible from the others, either with the naked eye or a magnifying device.
43. Minerals are naturally occurring substances found in the earth's crust. They can be composed of a single element or multiple elements, forming compounds. Minerals are classified as native minerals when they are pure elements like gold, silver, copper, or non-metals like sulfur and carbon. Most minerals, however, are compounds, such as quartz, calcite, mica, pyroxene, and olivine, which are combinations of different elements.
44. When electricity is passed through water, it undergoes electrolysis, breaking down into hydrogen and oxygen gases, showing that water is made of these two elements. In contrast, heating water only changes its physical state—from liquid to vapor—without altering its composition. This reveals that heating causes a physical change, while passing electricity causes a chemical change, proving that water is a compound made of hydrogen and oxygen chemically combined.
45. Pure substances are substances composed of only one type of particle and have a fixed or constant structure. Elements and compounds are types of pure substances. Elements are made up of only one kind of atom and cannot be broken down into simpler substances. Compounds, however, are composed of two or more different elements chemically combined in fixed ratios. They have different properties from the individual elements that constitute them.
46. Properties of a solution are:
- A solution is a homogeneous mixture.
 - Particles in a solution are smaller than 1 nm and are invisible to the naked eye.
 - They do not scatter a beam of light, making the path of light invisible.
 - Solute particles cannot be separated by filtration, indicating that a solution is stable.
47. Mixtures appear uniform, or homogeneous, when components are evenly distributed at the microscopic level, such as sugar dissolved in water. Non-uniform mixtures, or heterogeneous mixtures, have visible components like a salad, where the individual substances are not evenly distributed or visibly distinct from one another.
48. Two examples of alloys are stainless steel and brass. Stainless steel comprises iron, nickel, chromium, and carbon uniformly mixed, while brass consists of copper and zinc. The individual metals in these alloys don't react chemically but blend to retain their properties, forming a single solid-phase mixture.
49. Elements are pure substances consisting of only one type of atom and cannot be broken down into simpler substances. Examples include hydrogen, oxygen, and gold. Compounds, however, are made of two or more elements chemically combined in fixed ratios, and they exhibit properties different from the elements comprising them, like water and sodium chloride.
50. Mixtures are prevalent in daily activities, such as preparing meals. For instance, making a sprout salad involves combining ingredients like chickpeas and tomatoes without chemical changes. Similarly, when sugar dissolves in tea, it forms a uniform mixture. These examples illustrate how substances in mixtures maintain their properties while integrating into a daily routine.
51. a. Water is a compound because it is formed when hydrogen and oxygen chemically combine in a fixed ratio to produce a new substance with distinct properties.
- b. Iron sulfide is a compound because it forms when iron and sulfur chemically combine in a fixed ratio. It has uniform properties, cannot be separated physically, and its behaviour is different from its constituent elements.
- c. An element is a pure substance made of identical atoms that cannot be broken down further, e.g., hydrogen or gold. A compound is formed when two or more elements chemically combine in a fixed ratio, producing a new substance with distinct properties, like water (H_2O) or iron sulfide (FeS).

OR

Compounds cannot be separated by physical methods because their constituent elements are chemically bonded in fixed ratios. For instance, water molecules consist of hydrogen and oxygen

atoms chemically combined. Physical methods like filtration or evaporation only separate mixtures, not compounds, which require chemical reactions for decomposition.

52. a. Air is a uniform mixture because its components, like nitrogen, oxygen, argon, and carbon dioxide, are evenly distributed throughout, making the mixture consistent everywhere.
- b. Alloys are uniform mixtures because their components, like iron, nickel, and chromium in stainless steel, are evenly distributed throughout the material. The individual metals cannot be distinguished, making the mixture appear the same everywhere.
- c. Uniform mixtures have components evenly distributed and indistinguishable, like air or sugar in water. Non-uniform mixtures have visibly separate components, like sprout salad or sand in water. The type of mixture affects how the substances behave and how easily they can be separated.

OR

Air is a uniform mixture of gases, primarily nitrogen, oxygen, argon, carbon dioxide, and water vapor. It also contains suspended dust and pollutants. Since its components retain their individual properties and are evenly distributed, air fits the scientific definition of a mixture.

53. a. Sugar is a pure substance because it contains only one type of particle and cannot be physically separated into other substances.
- b. A pure substance is a type of matter that contains only one kind of particle and cannot be separated into other substances by any physical process. It has uniform composition and properties throughout.
- c. In everyday life, 'pure' means unadulterated, like milk or spices without additives. In science, 'pure' means a substance contains only one type of particle and cannot be separated physically into other substances. Thus, a product may appear pure but still be a mixture scientifically.

OR

Milk and soil are mixtures because they contain more than one type of particle and can be physically separated. Sugar and baking soda are pure substances as they contain only one type of particle and cannot be separated into other substances physically. This classification depends on particle composition.

54. a. Gold is a native mineral because it exists as a pure element in nature and is not chemically combined with other elements.
- b. Native minerals are pure elements, such as gold and sulfur, not made of compounds. Other minerals are compounds composed of two or more elements, like quartz, mica, and calcite, with distinct chemical compositions and properties.
- c. Minerals are essential in daily life; cement is made from calcite, quartz, and iron oxide, while talcum powder is obtained from talc. Traditional crafts like Dhokra art use metals from minerals to create durable and aesthetically pleasing sculptures, showing the importance of minerals in practical and cultural applications.

OR

Understanding matter helps us identify substances that have mass and occupy space, like elements, compounds, and minerals, which are used in everyday life and technology. Recognizing non-matter, such as light, heat, electricity, and emotions, helps distinguish physical substances from phenomena, enhancing our comprehension of the natural and physical world.

55. a. Air is a mixture because it contains multiple gases such as nitrogen, oxygen, argon, and carbon dioxide that retain their individual properties and are evenly distributed.
- b. Stainless steel is preferred because it is an alloy of iron, chromium, and nickel. It is stronger, more durable, and resistant to rust and corrosion, making it more suitable for long-lasting construction than pure iron.
- c. Understanding elements and compounds allows chemists to create fertilizers that improve crop yield and develop life-saving medicines and vaccines. Knowledge of chemical properties and reactions ensures safe, effective, and efficient solutions to enhance health and food production, benefiting society and supporting growing populations.

OR

Graphene aerogel is extremely light, highly porous, and has excellent absorbing capacity. These properties allow it to clean oil spills, save energy in devices, and be used in special coatings for

buildings. Its combination of lightness, strength, and versatility makes it a revolutionary material in science and engineering.

56. State whether the given statement is True or False:

(a) **(b)** False

Explanation:

False

(b) **(a)** True

Explanation:

This statement is true because compounds are formed when elements combine chemically in a fixed ratio. The composition of a compound is always constant, for example, water always contains hydrogen and oxygen in a 2 : 1 ratio.

(c) **(b)** False

Explanation:

False

(d) **(a)** True

Explanation:

This statement is true because evaporation is a physical method used to separate dissolved salt from water. When water evaporates, salt is left behind as a solid.

(e) **(b)** False

Explanation:

This statement is false because a compound is formed when two or more different elements chemically combine in a fixed ratio. A single atom cannot form a compound.

57. - The properties of both naphthalene and common salt should be known before we choose the separation technique.

- Naphthalene is a sublimate which on heating changes to gaseous state directly. Hence to separate a volatile compound (sublimate) from a non-volatile compound (non-sublimate), the sublimation process is used.

- In a China dish, the mixture is kept and is placed on a stand. An inverted funnel is kept over the mixture in China dish with plugged stem. The sublimate on heating gets collected on the funnel and common salt remains in the China dish.

58. Air is a mixture of several gases, and they can be separated by a process called fractional distillation of liquid air. First, air is filtered to remove dust and impurities, then cooled to very low temperatures until it liquefies. Water vapor and carbon dioxide are removed earlier because they would freeze and block equipment. The liquid air is then slowly warmed in a distillation column. Since different gases have different boiling points, they evaporate at different temperatures. For example, nitrogen boils at -196°C and is collected first, while oxygen boils at -183°C and is collected later. This method gives pure gases.

59. a. Solution: It is a homogeneous mixture of two or more substances. It consists of solute and solvent.

b. Different types of solution:

- **Based on solvent**-Aqueous and non-aqueous Aqueous solution has water as solvent (sugar + water) Non-aqueous solution has some other solvent but not water.

Example: (sulphur + carbon disulphide)

- Depending on the amount of solute dissolved in solvent-Dilute solution and concentrated solution.

- **Dilute solution**-Less amount of solute particles are present in a solvent. Concentrated solution-Amount of solute present in its maximum capacity in a solvent.

- Amount of solute present in its maximum capacity at a given temperature Saturated and unsaturated solution.

- **Saturated Solution**-It is a solution in which no more solute can further dissolve in a given solvent at a given temperature.

- **Unsaturated Solution**-It is a solution in which some more solute can dissolve in a solvent at a given temperature.

- Depending on the size of solute particles:

(i) **True solution Size** is very small and particles cannot be seen through naked eyes

(ii) **Suspension Size** is very big and can be seen through naked eyes

(iii) **Colloid Size** is intermediate between true solution and suspension

60.

Feature	Colloidal Solution	Suspension
Particle size	1 nm to 1000 nm	More than 1000 nm
Appearance	Appears homogeneous but is heterogeneous	Clearly heterogeneous
Visibility of particles	Particles not visible to the naked eye	Particles are visible
Stability	Stable, does not settle on standing	Unstable, settles on standing
Filtration	Cannot be filtered by filter paper	Can be separated by filtration
Tyndall effect	Shows Tyndall effect	May or may not show Tyndall effect

61. Water is a compound made of hydrogen and oxygen, playing an indispensable role in sustaining life and the environment. As a fundamental component of all living cells, it acts as a medium for biochemical reactions and is crucial for physiological processes. In the environment, water regulates climate by absorbing heat, helps nutrient cycling, and supports aquatic ecosystems. Its solvent property facilitates nutrient transport in organisms and the dissolution of minerals in soils, making it essential for plant growth. Consequently, water is not only vital for individual survival but also indispensable for maintaining ecological balance and supporting a sustainable habitat.

62. Fill in the blanks:

- (a) gaseous
- (b) one
- (c) hydrogen
- (d) Ratio
- (e) Homogeneous
- (f) Different
- (g) Compound
- (h) atoms
- (i) Mixture
- (j) Uniform