

JULY

SUBJECT: CHEMISTRYCLASS: VIIICHAPTER II:NATURE OF MATTER:ELEMENTS, COMPOUNDS AND MIXTURESNCERT FOLDERVERY SHORT ANSWER TYPE (2 marks)

1. What is meant by a pure substance? Give an example.

Ans: A pure substance contains only one kind of particle and has a fixed composition and definite properties.

(eg.) Elements: Gold (Au), Oxygen (O_2), Sulphur (S)
Compounds: Water (H_2O), Carbon dioxide (CO_2),
Sodium chloride (NaCl)

2. Name the process used by milkman to separate cream from milk.

Ans: centrifugation.

3. Classify the following elements as metal and non-metal. Aluminium, fluorine, phosphorus and calcium.

Ans:

Metals: Aluminium, calcium

Non-metals: Fluorine, Phosphorus

4. Name the apparatus by which mixture of oil and water can be separated.

Ans: Separating funnel

5. Define minerals.

Ans:

- * Minerals are natural substances that make up rocks, rocks are usually mixtures of minerals.
- * Some occur in native (elemental) form
(Au, Ag, Cu; non-metals like Sulphur, carbon)
- * Most are compounds (e.g. quartz, calcite, mica, pyroxene, olivine)

6. What is graphene aerogel?

Ans:

Graphene aerogel is an ultra-light, porous material made from graphene. It is one of the lightest solids and is used for oil spill clean up, energy storage and advanced electronics.

7. Define the following terms:

- (a) Element (b) Compound

Ans:

(a) Element: A pure substance made of only one type of atom, cannot be broken down by ordinary chemical means.

(b) Compound: A pure substance formed when two or more elements combine chemically in a fixed mass ratio.

8. Name two elements that exist in the liquid state.

Ans:

Mercury (Hg) - Metal
Bromine (Br₂) - Non-metal

9. Name one gaseous element, which is

i) Monoatomic

ii) Diatomic

Ans:

Monatomic : He (Helium)

Diatomic : O_2 (Oxygen)

10. Name the two metallic elements that can exist as liquids at about $30^\circ C$.

Ans: Gallium (Ga)
and Caesium (Cs)

SHORT ANSWER TYPE (3 marks)

1. List the points of differences between homogeneous and heterogeneous mixtures?

Ans:

(a) Heterogeneous mixtures:

This is a mixture where the different components are not uniformly distributed and can be visually identified.

(eg) a mixture of sand, salt and sulphur, or a handful of soil.

(b) Homogeneous mixture:

In this mixture, the components are uniformly distributed, and the mixture appears uniform throughout.

Examples include brass (an alloy of copper and zinc) and all types of solutions.

2. Classify each of the following as a homogeneous or heterogeneous mixtures:

Sodawater, Wood, air, Soil, Vinegar, Filtered tea

Ans:

Homogeneous mixtures:

Sodawater, Air, Vinegar,
Filtered tea

Heterogeneous mixture :

Loam, Soil

3. Name the method used to separate a mixture of the following.

(i) Ammonium chloride and Sodium chloride

(ii) Salt and Water

(iii) Alcohol and water

Ans:

(i) Sublimation

(ii) Evaporation

(iii) Fractional distillation

4. What type of mixture can be separated by the technique of crystallisation?

Ans:

Crystallisation is used to separate a homogeneous mixture (solution) in which a solid is dissolved in a liquid.

Example: Separating pure copper sulphate crystals or common salt crystals from their aqueous solution.

5. (a) Under which category of mixtures will you classify alloys and why?

(b) A solution is always a liquid. Comment.

(c) Can a solution be heterogeneous?

Ans:

(a) An alloy is made by mixing two or more metals (or a metal and a non-metal) uniformly. Its composition is the same throughout, and the different components cannot be distinguished by the naked eye.

eg: Brass - Cu & Zn

Steel - Fe & carbon

(ii) A solution is not always a liquid. It can be a solid, liquid, or gas, depending on the states of the solute and solvent.

(eg) Solid solution: Brass (Copper + Zinc)

Liquid solution: Salt dissolved in Water

Gaseous solution: Air (a mixture of gases)

(iii) No, a solution is always homogeneous, not heterogeneous, because the solute particles are uniformly distributed throughout the solvent. The composition is the same in every part of the solution.

(eg) Salt dissolved in water is a homogeneous solution.

6. How will you separate the components of a mixture of common salt and sand?

Ans:

To separate a mixture of common salt and sand, follow the steps given below.

(i) Add water to the mixture. The salt dissolves in water, while the sand remains insoluble.

(ii) Filter the mixture. The sand stays on the filterpaper as the residue, and the salt solution passes through as the filtrate.

(iii) Evaporate the filtrate. The water evaporates, leaving behind common salt.

Methods used: Dissolution → Filtration → Evaporation.

7. Classify the following into elements, compounds and mixtures.

(i) Silica

(ii) Air

(iii) Copper

(iv) Brass

Ans:

- (i) Silica - Compound
- (ii) Air - Mixture
- (iii) Copper - Element
- (iv) Brass - Mixture

8. Name a mixture which is used

- (a) by all living beings
- (b) in the construction of buildings
- (c) as food.

Ans:

- (a) A mixture used by all living beings is air.
- (b) A mixture commonly used in the construction of buildings is cement concrete.

Concrete is a heterogeneous mixture made of cement, sand, gravel and water.

- (c) A common mixture used as food is milk.

Milk is a colloid (heterogeneous mixture) containing water, fats, proteins, lactose and minerals.

Other examples include Fruit Salad, Vegetable Soup, Tea, Lemon juice etc.

9. Sodium chloride contains two elements, but it is still a pure substance.

Ans:

It contains two elements - Sodium (Na) and chlorine (Cl) - It is a pure substance because it is a compound.

* The elements are chemically combined in a fixed ratio (1:1) by weight.

* It has a definite composition and uniform properties throughout.

* The components cannot be separated by physical methods, they can only be separated

by chemical methods.

10. (i) Give two examples of minerals.
(ii) How many elements are known at present time?

Ans:

- (i) Calcite and Quartz
(ii) 118 elements known - 90 occur naturally, the rest are synthetic.

LONG ANSWER TYPE (5 marks)

1. (i) Name the separation technique you would follow to separate the following mixtures.

(a) Clear water from muddy water

(b) Kerosene and water

(c) Iron fillings and sand

- (ii) What is the advantage of fractional distillation over simple distillation?

Ans:

(i) (a) Sedimentation

(b) Separating funnel

(c) Magnet

- (ii) * Fractional distillation is used to separate two or more miscible liquids with close boiling points, whereas simple distillation is suitable only when the boiling points differ greatly.

* It gives better and purer separation than simple distillation because the fractionating column allows repeated evaporation and condensation.

2. Discuss the characteristics of the following with detail explanation along with suitable example?

(a) an element

(b) a mixture

(c) a compound

Ans:

(a) an element

Characteristics:

- * pure and homogeneous
- * Smallest unit showing properties is the atom.
- * May occur free (eg Au) or in compounds.
- * Form compounds by reacting with other elements.

(b) a mixture:

characteristics:

- * Variable composition (ratios can vary)
- * physical formation (no new substance, no chemical bonds)
- * Properties are averaged from components.
- * May be homogeneous or heterogeneous (solutions vs mechanical mixes)
- * physically separable (filtration, distillation, magnet etc)
- * Energy effects: dissolving may be exo/endo-thermic, mixing gases - no heat change.

(c) a compound:

characteristics:

- * New properties: constituents do not retain their original properties.

(eg) H_2 - (flammable) + O_2 (Supports burning) $\rightarrow \text{H}_2\text{O}$ (extinguishes fire)

- * Homogeneous: Every molecule has the same composition (eg H_2O has 2H and 1O).

- * Fixed composition: Elements combine in a

definite ratio by mass. (e.g. $H_2O = 1:8$ in water)

* Separation: Components can be separated only by chemical methods (e.g. electrolysis of water)

* Energy change: Formation often involves release or absorption of energy (Heat/light/electric).

3. Iron filings and sulphur were mixed together and divided into two parts, 'A' and 'B'. Part 'A' was heated strongly while part 'B' was not heated. Dilute hydrochloric acid was added to both the parts and evolution of gas was seen in both the cases. How will you identify the gases evolved?

Ans:

Sample A - Mixture (Mixture of Iron + Sulphur)

Reaction with HCl:

Iron reacts to produce Iron chloride and hydrogen gas.

* Hydrogen gas is colourless, odourless and burns with a pop sound.

* Sulphur remains as a yellow solid and does not react.



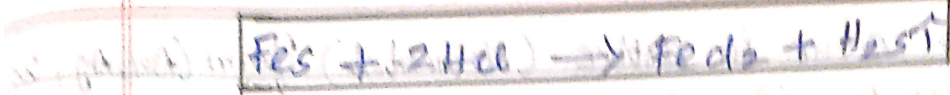
Sample B - Compound (Iron sulphide)

* Appearance: Black mass, uniform in colour and texture.

* Magnet test: Not attracted by a magnet.

* Reaction with HCl: Reacts to form Iron chloride + hydrogen sulphide gas.

* Hydrogen sulphide gas is colourless but has a rotten egg smell.



4. (A) Suggest methods for the separation along with reason, of the following mixtures:
- Mixture of liquid A (Boiling point 365K) and liquid B (Boiling point 354K)
 - Mixture of liquid C (Boiling point 353K) and liquid D (Boiling point 413K)
- (b) What are minerals? Describe their uses in human life.
- (c) What are mixtures? Explain their types.

Ans:

(a) (i) Mixture of liquid A (B.P. 365K) and liquid B (B.P. 354K)

method of separation: Fractional distillation

Reason:

Since the boiling points are very close a difference of only 11K, fractional distillation is used. The fractionating column allows repeated evaporation and condensation, giving better separation of the two liquids.

(ii) Mixture of liquid C (B.P. 353K) and liquid D (B.P. 413K)

method of separation: Simple distillation

Reason:

Because the liquids have a large difference in boiling points (60K). The liquid with the lower boiling point (353K) vaporizes first and is collected separately.

(b) * Minerals are natural substances that make up rocks, rocks are usually mixtures of minerals.

* Some occur in native (elemental) form (Au, Ag, Cu, non-metals like Sulphur, carbon).

* Most are compounds (e.g. Quartz, Calcite, mica, Pyroxene, Olivine)

Minerals in Everyday life:

* Cement: made using minerals (Calcite, quartz, alumina, iron oxide).

Talcum powder: from the minerals.

(C) A mixture is a physical combination of two or more substances in any proportion, where each substance retains its own properties.

Types of mixtures:

(i) Homogeneous mixture:

* Composition is uniform throughout.

* The components cannot be seen separately.

* Has only one phase.

(eg) Salt solution, Sugar solution, air, brass

(ii) Heterogeneous mixture:

* Composition is not uniform throughout.

* The components can be seen separately.

* Has two or more phases.

(eg) Sand and water, oil and water, soil, concrete.

Classwork writing

VSA : 1, 6

SA : 5, 6, 9

LA : 1, 3, 4