CBSE Test Paper 01

Chapter 02 Is matter around us pure

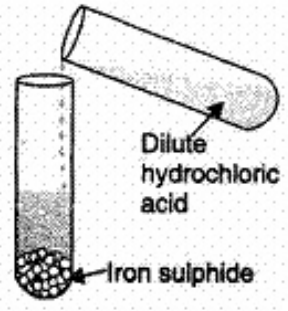
1. Which of the following settles down when allowed to stand undisturbed doe sometimes? **(1)**

   a. Copper sulphate solution
   b. Blood
   c. Muddy water
   d. Solution of egg albumin in water

2. A mixture of iron filings and sulphur is heated, the colour of the mixture will change **(1)**

   a. black to yellow
   b. yellow to black
   c. brown to yellow
   d. black to brown

3. In the experiment shown a gas is evolved. Four groups of students have recorded their observations on the gas produced as shown in the following table. Choose the correct set of observations. Note that the positive response are shown by '✓' and negative by '✗' signs respectively. **(1)**



a.

Colour of the gas	Odour of the gas	Flammability	Action on lead acetate paper
✗	✓	✗	✓

b.

Colour of the gas	Odour of the gas	Flammability	Action on lead acetate paper
×	✓	✓	×

c.

Colour of the gas	Odour of the gas	Flammability	Action on lead acetate paper
×	×	✓	×

d.

Colour of the gas	Odour of the gas	Flammability	Action on lead acetate paper
✓	✓	×	✓

4. Which of the following solution scatter light? **(1)**

   a. None of these
   b. Both colloidal solution and suspension
   c. colloidal solution
   d. suspension

5. A Substance can be beaten into sheets and beaten into wires. What will you call it? **(1)**
   a. It is both brittle and lustrous
   b. It is both sonorous and ductile
   c. It is both Malleable and ductile
   d. It is both malleable and brittle

6. Which of the following methods would you use to separate cream from milk? ?**(1)**

   a. centrifugation
   b. filtration
   c. distillation
   d. fractional distillation

7. A shining thick liquid is often used in glass thermometers. Name it. **(1)**

8. A saturated solution becomes unsaturated on heating. Why is it so? **(1)**

9. How will you justify that rusting if iron is a chemical change? **(1)**
10. Define crystallisation. **(1)**
11. In what respect does a true solution differ from a colloidal solution? **(3)**
12. Describe a method that can be used to separate a mixture of salt and ammonium chloride. **(3)**
13. 'Sea water can be classified as homogeneous as well as heterogeneous mixture.' Comment. **(3)**
14. A compound is regarded as a pure substance while the mixture is not. Give reason. **(3)**
15. Fog and cloud are both colloidal in nature. How do they differ? **(1)**

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Answers

1. c. Muddy water

   Explanation: Muddy water will settle down because particles are heavy and settle due to gravity. Setting down of coarse particles under the influence of gravity is called sedimentation. During sedimentation, heavier particles settle down faster than finer particles.

2. b. yellow to black

   Explanation: A mixture of iron filings and sulphur is heated, the colour of the mixture will change yellow to black.

   S is black in colour and FeS is black in colour.

   Iron + sulphur → Ferrous sulphide

   Fe + S → FeS

3. a.

Colour of the gas	Odour of the gas	Flammability	Action on lead acetate paper
×	✓	×	✓

   Explanation: If we add HCl in FeS it will release H_2S Reaction takes place as follows:

   FeS + 2HCl → FeCl + H_2S

   H_2S gas turns lead acetate paper black. It is colourless, has smell of rotten eggs, does not catch fire.

4. b. Both colloidal solution and suspension

   Explanation: As the particle size of both colloidal & suspension is large they are able to scatter light.

5. c. It is both Malleable and ductile

   Explanation: The property of metals by which they can be beaten in to thin sheets is called malleability.

   The property of metal by which it can be drawn into wires is called ductility.

Gold is most malleable and ductile element.

6. a. centrifugation

   Explanation: In centrifugation by churning the milk at a high speed , the cream collects at the centre and being lighter than milk floats at the top of the mixture .As cream is lighter than milk.

7. The shining liquid is mercury (metal). It is used in glass thermometers as it is the onlyetal which is liquid at room temperature. Besides it does not stick to glass and it has high coefficient of expansion due to which a slight change in temperature can be easily recorded.
8. Solubility of a solute (other than gas) increase with the increase in temperature. On heating the liquid develops the capacity of dissolving some more solute to it. That is the saturated solution becomes unsaturated due to increase in the solubility.
9. Chemical change can be explained as a change in which a new substance is formed and the process is irreversible. The rust is a brown chemical compound known as hydrated ferric oxide ($Fe_2O_3.xH_2O$) which is formed when iron reacts with oxygen and water. Formula of rust shows that iron has undergone a chemical change.
10. **Crystallisation** is a process that separates a pure solid in the form of crystals from its solution. It is used to purify solids. E.g. Salt obtained from sea water is purified using crystallisation.
11. i. A true solution is homogeneous mixture whereas a colloidal solution is a heterogeneous mixture.
    ii. A true solution is always clear and transparent whereas a colloidal solution is translucent.
    iii. The diameter of the particles of a solute in a true solution is of the order of 1 nm or less. The size of the colloidal particles is between 1 nm and 100 nm.
    iv. A solute can be recovered from a true solution by evaporation or crystallisation but the particles of a colloidal solution cannot be recovered by evaporation or crystallisation. However, they can be separated through centrifugation.
    v. Particles of a true solution do not scatter a beam of light whereas particles of a colloidal solution scatter a strong beam of light that is passed through the solution.
12. Ammonium chloride exhibits sublimation and changes directly from solid into the gaseous state on heating.

    Therefore, a mixture of salt and ammonium chloride can be separated by the process

of sublimation.

The following steps would be involved in the separation:-

i. The mixture of ammonium chloride (NH_4Cl) and salt is placed in a china dish. The china dish is placed inside an inverted funnel as shown in the figure.
ii. The mixture is heated on a low flame. On heating, ammonium chloride sublimes and changes directly into vapours. The vapours of ammonium chloride get condensed on the inner sides of the funnel.
iii. Salt does not sublime and is left behind in the china dish.
iv. The fine powder of NH_4Cl can be scrapped from the sides of the funnel.

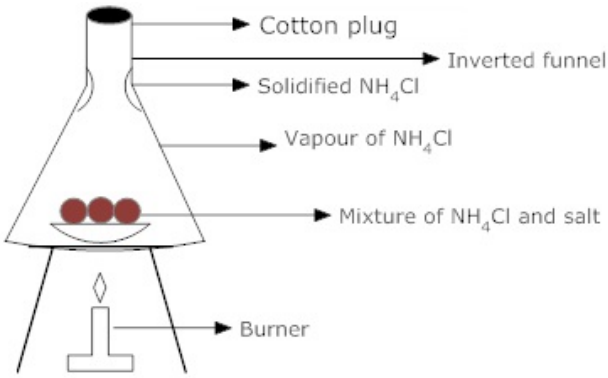

Fig: Separation of NH_4Cl and salt by sublimation

13. Sea water is a mixture of salts and water which cannot be separated except by evaporation. Therefore, sea water is considered as a homogeneous mixture.
But other than salts and water, sea water also contains mud, decayed plant, etc. So it is considered as a heterogeneous mixture.
Therefore, sea water can be classified as homogeneous as well as heterogeneous mixture
14. A compound is always a single substance in which two or more elements are combined chemically. A mixture is a combination of elements or compounds or both. Thus, a compound fulfils the definition of a pure substance but not a mixture. Moreover, a compound has a sharp melting or boiling point while a mixture does not have.
15. Fog and cloud are the examples in which liquid is the dispersed phase and gas (air) is the dispersion medium. The only difference between them is that clouds are formed in the upper atmosphere while fog gets formed in the region close to earth.

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1. The components of compound can be separated by using **(1)**

   a. chemical method
   b. physical method
   c. none of these
   d. cannot be separated by using any method.

2. Which of the following will be a heterogeneous mixture? **(1)**

   a. Common salt and water
   b. Cane sugar and water
   c. Alum and water
   d. Albumin and water

3. Which one of the following will form a translucent solution in water? **(1)**

   a. Soil
   b. Sand
   c. Starch
   d. Sugar

4. 4 g of solute are dissolved in 36 g of water. What is the mass percent of the solution? **(1)**

   a. 10%
   b. 20%
   c. 100%
   d. 5%

5. The system when starch is added to hot water is: **(1)**

   a. colloid
   b. mixture

c. suspension
d. true solution

6. An example of colloid is **(1)**

   a. Salt solution
   b. Milk
   c. Sugar solution
   d. Air

7. What types of mixtures can be separated by technique known as crystallisation? **(1)**

8. Define solubility. **(1)**

9. What is the range of the size of the particles of dispersed phase in a colloidal solution? **(1)**

10. Which separation techniques will you apply for the separation of the butter from curd? (**1)**

11. What is meant by sedimentation? Where this method is used? **(3)**

12. Write the steps you would use for making tea. Use the words solution, solvent, solute, dissolve, soluble, insoluble, filtrate and residue. **(3)**

13. Differentiate between metals and non-metals based upon the various properties that they show. **(3)**

14. Which of the component in a solution will act as solute and which as solvent when both are in the same physical states? **(3)**

15. Pragya tested the solubility of three different substances at different temperatures and collected the data as given below (results are given in the following table, as grams of substance dissolved in 100 grams of water to form a saturated solution).

Substance dissolved	Temperature in K				
	283	293	313	333	353
	Solubility				

Potassium Nitrate	21	32	62	106	167
Sodium Chloride	36	36	36	37	37
Potassium Chloride	35	35	40	46	54
Ammonium Chloride	24	37	71	55	66

a. What mass of potassium nitrate would be needed to produce a saturated solution of potassium nitrate in 50 grams of water at 313 K?
b. Pragya makes a saturated solution of potassium chloride in water at 353 K and leaves the solution to cool at room temperature. What would she observe as the solution cools? Explain.
c. Find the solubility of each salt at 293 K. Which salt has the highest solubility at this temperature?
d. What is the effect of change of temperature on the solubility of a salt?

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Answers

1. a. chemical method

   Explanation: The components of compound can be separated by chemical methods only because they have undergone chemical changes while formation which is physically irreversible.

2. d. Albumin and water

   Explanation: The mixture in which particles are not distributed evenly and forms separate layer if left undisturbed. The mixture of Albumin and water forms a heterogeneous mixture.

3. c. Starch

   Explanation: Starch forms colloidal solution. Colloidal solutions are translucent and their particles can pass through filter paper to give translucent filtrate.

4. a. 10%

   Explanation: Mass of solute = 4 g

   Mass of solution = 36 +4 = 40g

   Mass percent of solution = $\frac{Mass\ of\ solute}{Mass\ of\ solution} = \frac{4}{40} \times 100\% = 10\%$

5. a. colloid

   Explanation: The colloid of starch is prepared by dispersion method. 2-3 g of powdered/crushed starch is dissolved in 3- 4 ml of water to make a thin paste. This paste is added to100 ml of boiling water while stirring. Allow the solution to cool and filter. The filtrate is colloid of starch.

6. b. Milk

   Explanation: Colloidal solution is a heterogeneous mixture. The solute particles cannot be separated by filtration. The solute particles do not settle down and the solution is stable.

   Air is a mixture, salt solution and sugar solution are a true solution and milk is

a colloid having disperse phase of protein and fat in dispersing medium of water and other substance.

7. The solid mixtures in which one component or impurity is less soluble in a particular solvent as compared to the other. For example, impure samples of copper sulphate, potassium nitrate, potash alum etc. can be purified by this method.

8. The maximum quantity of solute, which can dissolve in 100 gram of a solvent is called solubility of solute in that solvent, at a given temperature.

9. It ranges from 1 nm (10^{-9} m) to 100 nm (10^{-7}m).

10. Centrifugation: Butter will get separated upon centrifugation

11. The process of setting of heavy solids at the bottom is called sedimentation. This method is used to seperate the components of a mixture of sand and water. It is seen that the sand and mud settle at the bottom with clear water above it. This is called sedimentation.

12. Steps that would be used for making tea are as follows:-
    i. The **solvent** used for making tea is water. Take some amount of **solvent** in a pan and heat it over a burner.
    ii. After the solvent is sufficiently warm, add a little amount of sugar to the **solvent**. Sugar is used as a **solute** to provide a sweet taste to the **solvent**.
    iii. The **solute** will dissolve completely in the **solvent** and form a true **solution**.
    iv. Add some tea leaves to the true **solution**. The chemical substances present in the tea leaves are soluble and will **dissolve** in the solution.
    v. Pour some milk into the pan. The milk will **dissolve** in the **solution**.
    vi. Bring the **solution** to a boil and switch off the burner. The tea leaves will remain **insoluble** in the **solution**.
    vii. Filter the **solution** with a strainer to separate the **insoluble** tea leaves.
    viii. After filtration, the tea **solution** will be obtained as a **filtrate**. The tea leaves that remain as **residue** can be thrown away.

13.

Metals	Non-metals

Metals have lustre i.e. they have a shinning glow.	Non-metals do not have lustre. They cannot be polished.
They are mostly solids at room temperature. Exceptions - Mercury and Gallium are liquids at 30 ^{o}C	They are either gases or brittle solids at room temperatures.
Most of the metals are good conductors of heat and electricity.	They are mostly bad conductors of heat and electricity. Exception: Graphite
They are malleable i.e. they can be beaten into flat sheets. Exception: Zinc	They are non-malleable.
They are ductile i.e. they can be drawn into wires. Exception: Zinc	They are non-ductile.
They are sonorous (produce a sound on being hit)	They are non-sonorous.
They generally have high melting points and high boiling points.	They generally have low melting points and low boiling points.
E.g. Sodium, Magnesium, and Aluminium	E.g. Chlorine, Oxygen and Carbon

14. The component which is present in larger amount will be the solvent and the other which is present in lesser quantity will be the solute.
15. a. The amount of potassium nitrate required to produce a saturated solution at 313 K in 100 g of water = 62 g
    The amount of potassium nitrate that would be required to produce a saturated solution at 313 K in 50 g of water = (62 x 50) / 100 g
    Therefore, 31 g of potassium nitrate would be required to produce a saturated solution at 313 K in 50 g of water.
    b. At 373 K, preparation of a saturated solution will need 54 g of potassium nitrate. At a room temperature of 293 K, a saturated solution of potassium nitrate requires just 35 g potassium nitrate. As the solution cools, excess potassium nitrate (54 g – 35 g = 19 g) will precipitate out as insoluble salt.
    c. Solubility of potassium nitrate, sodium chloride, potassium chloride and

ammonium chloride in 100 g of water at 293 K are 32 g, 36 g, 35 g and 37 g respectively.

Ammonium chloride has the highest solubility (37 g) at this temperature.

d. Effect of change of temperature on the solubility of a salt: As a general rule, the solubility of the salts is directly proportional to the temperature. If the temperature is increased, the solubility of the salt generally increases.

CBSE Test Paper 03

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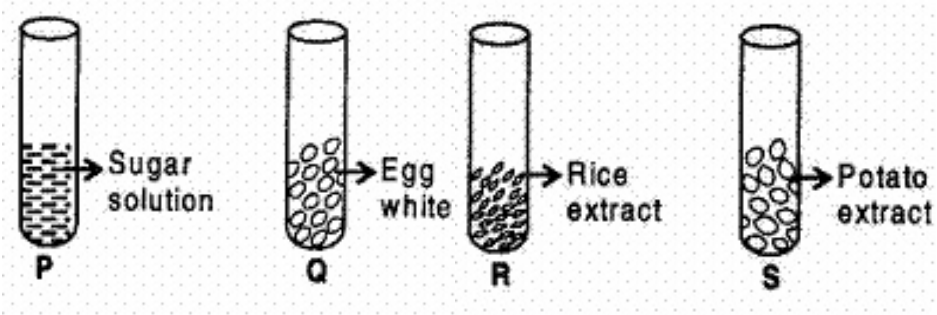
1. Four test P, Q, R, S shown below contain the following:



On adding 2 drops of iodine to each tube, which will show blue-black solution **(1)**

   a. Q and R
   b. R and S
   c. P, Q, R and S
   d. P and Q

2. When you add carbon disulphide in a test tube containing a mixture of iron fillings and sulphur powder, then what would you observe after shaking the test tube well? **(1)**

   a. After sometimes, carbon disulphide, sulphur and iron filings form three separate layers in the test-tube
   b. Some brown gas is evolved
   c. Sulphur dissolves to from colourless solution and iron filings settles down
   d. Yellow solution is formed and iron filings settles down.

3. The process of evaporation is fast when the mixture is **(1)**

   a. heated but covered
   b. heated but not covered
   c. covered but not heated
   d. neither heated nor covered

4. Which of the following would show positive test for the presence of starch? **(1)**

a. Bread
b. Milk
c. Coriander
d. Cauliflower

5. Match the following with correct response. **(1)**

Column A	ColumnB
(1) Substance retain their property	(A) Element
(2) Elements are combined in fixed proportion by mass	(B) Mixture
(3) Simple substance that cannot be broken down	(C) Atom
(4) Smallest unit of compound	(D) Compound

a. 1-C, 2-B, 3-D, 4-A
b. 1-B, 2-D. 3-A, 4-C
c. 1-D, 2-A, 3-C, 4-B
d. 1-A, 2-C, 3-B, 4-D

6. An emulsion is a colloidal solution formed by mixing **(1)**
   a. Two miscible liquids
   b. Two immiscible liquids
   c. Any two liquids
   d. Any two gases

7. What is mass percentage of a solution? **(1)**

8. Name the technique to separate:-

   a. butter from curd
   b. salt from sea-water
   c. camphor from salt

9. Is fresh air which we breathe in, a pure substance in terms of science? **(1)**

10. To the already prepared solution of a 'solute A' prepared in water, a small amount of 'A' is added. However, it does not dissolve. What does it indicate? **(1)**

11. What is a colloid? What are the various properties of colloids? **(3)**

12. What is a suspension? What are the properties of a suspension? **(3)**

13. A solution of H_2SO_4 acid is labeled as 95 percent. What mass of this solution should be diluted with water to get 5 L of solution containing 10 g of H_2SO_4 per litre? **(3)**

14. Sucrose (sugar) crystals obtained from sugarcane and beetroot are mixed together. Will it be a pure substance or a mixture? Give reasons for the same. **(3)**

15. Which separation techniques will you apply for the separation of the following? **(5)**

    a. Sodium chloride from its solution in water.
    b. Ammonium chloride from a mixture containing sodium chloride and ammonium chloride.
    c. Small pieces of metal in the engine oil of a car.
    d. Different pigments from an extract of flower petals.
    e. Butter from curd.
    f. Oil from water.
    g. Tea leaves from tea.
    h. Iron pins from sand.
    i. Wheat grains from husk.
    j. Fine mud particles suspended in water.

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Answers

1. b. R and S

   Explanation: Rice and potato contain starch. Starch is complex carbohydrate which consists of manly gloucose molecules. It gives blue-black colour with iodine solution.

2. c. Sulphur dissolves to from colourless solution and iron filings settles down

   Explanation: Sulphur dissolves to from colourless solution because carbon disulphide is a colourless volatile liquid and a non polar solvent. Being heavy iron filings settles down under the effect of gravity.

3. b. heated but not covered

   Explanation: Evaporation is a type of vaporization, that occurs on the surface of a liquid as it changes into the gaseous phase. When heating is done and the mixture is not covered at that time evaporation is fast.

4. a. Bread

   Explanation: When iodine solution added in bread its colour change black. So, bread contains starch. Foods made from starchy vegetables, grains or their flours, such as french fries, baked potatoes, breads, pasta, rice, cookies and cakes, are all high in starches.

5. b. 1-B, 2-D. 3-A, 4-C

   Explanation:

   i. B In mixtures the components do not lose their properties.
   ii. D In a compound the constituent elements combine in fixed proportion by mass.
   iii. A Elements are made up of same kind of atoms & elements can not be further broken down.
   iv. C An atom is the smallest unit of matter that has the properties of an element.

6. b. Two immiscible liquids

Explanation: Emulsions are an example of colloids composed of tiny particles suspended in another immiscible (unmixable) material. An emulsion is a suspension of two liquids that usually do not mix together. These liquids that do not mix are said to be immiscible.

7. **Mass percentage of a solution** is defined as the mass of a solute (in grams) present in one hundred gram of a solution.
   Mass percentage = (Mass of solute / Mass of solution) x 100

8. a. Technique to separate butter from curd: **Centrifugation**
   b. Technique to separate salt from sea-water: **Evaporation**
   c. Technique to separate camphor from salt: **Sublimation**

9. No, it is not a pure substance but it is a homogeneous mixture of several gases (e.g., nitrogen, oxygen, carbon dioxide, water vapours etc.).

10. This indicates that the solution of the substance 'A' in water is of saturated nature. The solution is known as saturated solution.

11. Colloids are heterogeneous mixtures in which the particle size is so small that the particles cannot be seen by naked eyes. The suspended particles form the dispersed phase of the colloid. The solvent in which the colloidal particles are suspended forms the continuous phase or the dispersing medium of the colloid. E.g. Milk.
    The properties of a colloid are as follows:-

    i. A colloid is heterogeneous in nature but appears homogeneous.
    ii. The size of colloidal particles is too small to be seen individually by naked eyes. The size of the particles is between 10^{-7} cm to 10^{-5} cm. They can easily pass through a filter paper.
    iii. The particles of a colloidal solution scatter a beam of light passing through it and make its path visible.
    iv. The particles of a colloidal solution do not settle down under the effect of gravity when the solution is left undisturbed for some time. They are quite stable.

12. A suspension is a heterogeneous mixture in which the solute particles do not dissolve but remain suspended throughout the bulk of the medium.

The properties of a suspension are as follows:-

a. The particle size (diameter) is more than 10^{-5} cm. Hence, the particles can be seen through naked eyes.
b. The particles of a suspension scatter a beam of light passing through it.
c. The particles have a tendency to settle down at the bottom of the vessel under the action of gravity when left undisturbed.
d. The particles of a suspension can be separated by through the process of filtration.

13. The concentration of the acid is given as 95 percent.
This means that 95 g of H_2SO_4 is present in 100 g of the acid solution.
1 L of the diluted H_2SO_4 solution should contain 10 g of H_2SO_4.
Therefore, 5 L of the diluted solution should contain 50 g of H_2SO_4.
50 g of H_2SO_4 will be present in $\frac{50 \times 100}{95}$ g of the solution
or 50 g of H_2SO_4 will be present in 52.63 g of the solution.
Therefore, 52.63 g of the given solution should be diluted with water to get 5 L of solution containing 10 g of H_2SO_4 per litre.

14. When sucrose (sugar) crystals obtained from sugarcane and beetroot are mixed together, it will not lead to a mixture. It will be a pure substance because the chemical composition of sucrose crystals will be the same whether the sucrose crystals are obtained from sugarcane or from beetroot. The combined substance will have sucrose crystals of only one kind and will have a definite set of properties - that of sucrose.

15.

	Mixture	**Separation technique**
(a)	Sodium chloride from its solution in water	Evaporation of water
(b)	Ammonium chloride from a mixture containing sodium chloride and ammonium chloride	Sublimation of ammonium chloride
(c)	Small pieces of metal in the engine oil of a car	Filtration

(d)	Different pigments from an extract of flower petals	Chromatography
(e)	Butter from curd	Centrifugation of curd
(f)	Oil from water	Separating funnel
(g)	Tea leaves from tea	Filtration by using a strainer
(h)	Iron pins from sand	With the help of a magnet
(i)	Wheat grains from husk	Winnowing
(j)	Fine mud particles suspended in water	Centrifugation