

## Is Matter Around Us Pure

1. Different substances are classified as:

- (I) Pure substance  
(II) Homogeneous mixture  
(III) Heterogeneous mixture

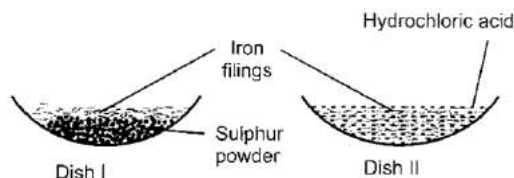
A few common substances are listed below.

- (i) Air, (ii) Graphite, (iii) Gasoline, (iv) Diamond,  
(v) Tap water, (vi) Iron, (vii) Sodium chloride,  
(viii) Iodised salt, (ix) Brass, (x) Oil and water

Which of the following represents the correct classification of the given substances?

- (a) I - (ii), (vi), (ix); II - (i), (v), (vii); III - (iii), (iv), (viii), (x)  
(b) I - (ii), (iv), (vi), (vii); II - (i), (iii), (v), (viii), (ix); III - (x)  
(c) I - (i), (iv), (vii), (ix); II - (ii), (v), (viii); III - (iii), (vi), (x)  
(d) None of these represents the correct match.

2. Nidhi took two China dishes and marked them as I and II.



In China dish I, she mixed iron filings and sulphur powder. In China dish II, she mixed iron filings and dilute hydrochloric acid. What were her observations in both the dishes?

- (a) In China dish I, a mixture is formed, where iron filings and sulphur powder can be seen separately.  
(b) In China dish II, a new compound is formed, which is different from iron filings and dilute hydrochloric acid.  
(c) A colourless and odourless gas comes out from China dish II.  
(d) All the above observations are correct.

3. Which of the following statements is/are incorrect?  
I Centrifugation method can be used to separate butter from cream.  
II Coloured component of blue ink can be separated by evaporation.

III Chromatography can be used to detect drugs in blood.

IV Camphor can be separated from salt by crystallisation.

- (a) II only  
(b) II and III only  
(c) IV only  
(d) II and IV only

4. The boiling points of a few gases found in air are given below:

Element	Krypton	Neon	Nitrogen	Oxygen
Boiling point (°C)	-152	-246	-196	-183

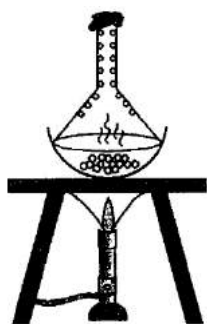
If liquid mixture is fractionally distilled, the order of gases distilling out is

- (a) Krypton, Neon, Nitrogen, Oxygen  
(b) Neon, Nitrogen, Oxygen, Krypton  
(c) Nitrogen, Neon, Oxygen, Krypton  
(d) Oxygen, Neon, Nitrogen, Krypton.

5. Soham, a class 9 student mixed some iron filings and sulphur in a China dish and heated them strongly to obtain a residue. Which of the following is not a characteristic property of the residue?

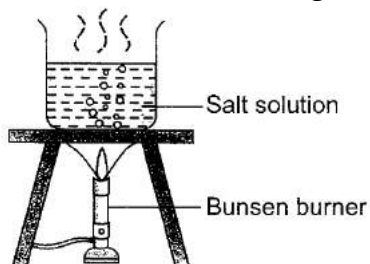
- (a) It cannot be separated into sulphur and iron filings by normal physical methods.  
(b) Its properties are completely different from iron and sulphur.  
(c) Its composition is same throughout.  
(d) Its appearance is different from iron and sulphur but it shows chemical properties of both iron and sulphur.

6. Sheela heated a mixture of iodine and common salt by keeping an inverted funnel on it. After some time, she observed that



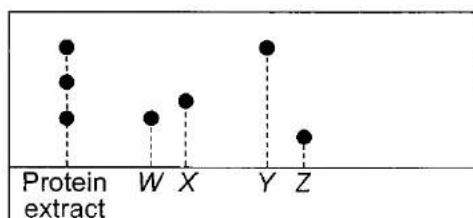
- (a) White fumes come out from the mixture
- (b) Violet particles deposit on the neck of the funnel
- (c) White particles deposit on the neck of the funnel
- (d) A gas with popping sound comes out.

7. Geetika poured 20 g of salt into 200 mL of water in a beaker. She stirred the water to dissolve the salt completely. Then she heated the solution until it was reduced to half. How many grams of salt can be recovered from the remaining solution?



- (a) 0 g
- (b) 10 g
- (c) 20 g
- (d) 40 g

8. The given chromatogram was obtained for proteins extracted from soya milk.

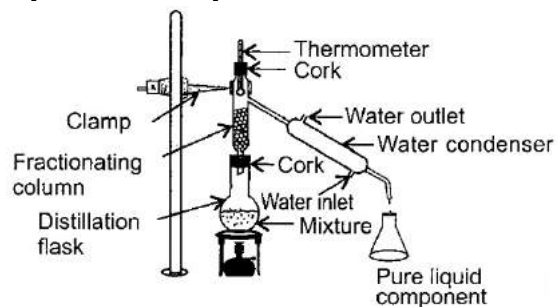


- The components present in protein extract are
- (a) W and X
  - (b) X and Y
  - (c) W and Y
  - (d) Y and Z

**Direction (Q. No. 9 and 10):** Read the given passage carefully and answer the following questions.

The constituents of a heterogeneous mixture are X, Y and Z. If mixture containing X and Y is taken, X can be separated using magnetic separation from Y. If mixture containing Y and Z is taken, the two can be separated using evaporation method.

9. The different states of X, Y and Z respectively are
- (a) Solid, Solid, Liquid
  - (b) Solid, Liquid, Solid
  - (c) All are liquids
  - (d) All are solids.
10. Which of the following identifies X, Y and Z correctly?
- (a) Iron, salt, water
  - (b) Sulphur, carbon disulphide, water
  - (c) Gun powder, common salt, water
  - (d) Iodine, sand, alcohol
11. What is the function of X in the given experimental set-up?



- (a) To apply pressure to the mixture in distillation flask
- (b) To allow only lower boiling component to escape
- (c) To cool and condense the vapours
- (d) To allow the water from the mixture to move out

12. Sahil took a white solid from his teacher to find out its melting point. During the experiment, he found that the melting point was  $160^{\circ}\text{C}$ . But, the teacher told him that actual melting point of the solid is  $150^{\circ}\text{C}$ . What could be the reason for Sahil's observation?
- (a) Melting point of a solid depends upon the procedure and the amount taken.
  - (b) Solids can have different melting points depending upon the method of storage.

- (c) The solid contains some impurities mixed with the pure compound.  
 (d) If solid is heated strongly, the melting point increases.

- 13.** Natural water is impure and needs to be purified before this water can be supplied to homes for drinking purposes. The sequence of steps involved in purification of water is  
 (a) Filtration, sedimentation, decantation and aeration  
 (b) Sedimentation, loading, filtration and chlorination  
 (c) Chlorination, aeration, sedimentation and filtration  
 (d) Chlorination, filtration and distillation.

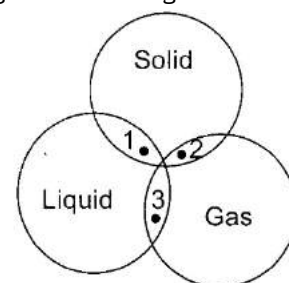
- 14.** Ms Mehta, a science teacher gave different mixtures to four groups of students to separate their components. Which group was not following the correct method?  
 (a) Group 1 was separating a mixture of ethyl alcohol and water by using separating funnel.  
 (b) Group 2 was separating a mixture of ammonium chloride and sodium chloride using sublimation.  
 (c) Group 3 was separating a mixture of iron pins and sand by using a magnet.  
 (d) Group 4 was separating mud particles suspended in water using sedimentation and decantation.

- 15.** Read the given passage and fill in the blanks by choosing an appropriate option. When a mixture of two i liquids having a difference of  $25^{\circ}\text{C}$  in their boiling points is to be separated, a ii is used which increases the iii surface area. As a result, when the vapours of both the liquids rise, the iv volatile liquid will condense while the vapours of v volatile liquid will rise.

(i)	(ii)	(iii)	(iv)	(v)
(a) Immiscible	Distillation flask	Heating	More	Less
(b) Non-volatile	Condenser	Cooling	Less	More
(c) Miscible	Fractionating column	Cooling	Less	More
(d) Volatile	Condenser	Heating	More	Less

## Achievers Section (HOTS)

- 16.** Study the given Venn diagram carefully.



Which of the following colloidal systems correctly represent points 1, 2 and 3?

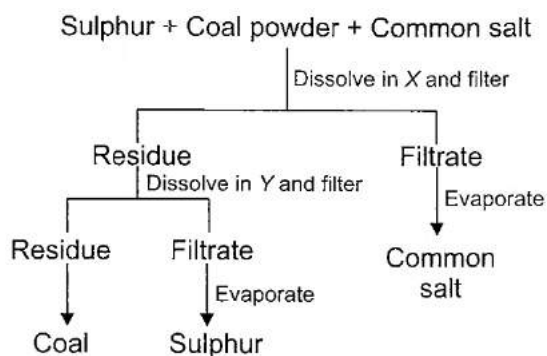
	1	2	3
(a)	Mist	Whipped cream	Dust fumes
(b)	Milk	Hair cream	Pumice stone
(c)	Paints	Smoke	Cloud
(d)	Coloured glasses	Wings of butter flies	Butter

- 17.** Match column I with column II and select the correct option from the codes given below.

Column I	Column II
(A) Sublimation	(i) Separation of water and $\text{CCl}_4$
(B) Magnetic separation	(ii) Separation of $\text{NaCl}$ from $\text{KNO}_3$
(C) Distillation	(iii) Separation of benzene and aniline
(D) Separating funnel	(iv) Separation of iron and sand
(E) Fractional Crystallisation	(v) Separation of iodine and sand

- (a) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv), (E)-(v)  
 (b) (A)-(v), (B)-(iv), (C)-(iii), (D)-(i), (E)-(ii)  
 (c) (A)-(iv), (B)-(v), (C)-(ii), (D)-(i), (E)-(iii)  
 (d) (A)-(i), (B)-(ii), (C)-(iv), (D)-(v), (E)-(iii)

- 18.** Study the given flow chart and choose the correct statements.



(i) The property used to separate the mixture is solubility of different components in different solvents.

(ii) Sulphur is soluble in carbon disulphide, salt in water and coal is insoluble in both.

(iii) X is water and Y is carbon disulphide.

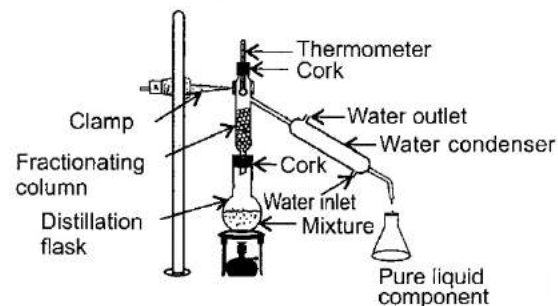
- (a) (i) and (ii) only      (b) (ii) and (iii) only  
(c) (i) and (iii) only      (d) All are correct.

**19.** Siddharth dissolved a mixture into water and then filtered it. Solid X was left behind as residue in the filter paper and solid V was obtained by evaporating the filtrate to dryness. X and V could be respectively

- (a) Sodium hydroxide and calcium carbonate  
(b) Calcium chloride and sodium carbonate

- (c) Calcium carbonate and sodium chloride  
(d) Sodium carbonate and calcium chloride.

**20.** Which of the following statements about the given experimental set-up is/are incorrect?



I. It is used to separate a mixture of two or more miscible liquids for which the difference in boiling points is more than 25 K.

II. It is used for the separation of different gases from air.

III. It is used to separate acetone and water from their mixture.

IV. It is based on the principle of repeated cooling and condensation of vapours by providing surface for the vapours.

- (a) I only      (b) III and IV only  
(c) I and II only      (d) I and III only

## Answer key

<b>1.</b> B	<b>2.</b> D	<b>3.</b> C	<b>4.</b> B	<b>5.</b> D
<b>6.</b> B	<b>7.</b> C	<b>8.</b> C	<b>9.</b> A	<b>10.</b> A
<b>11.</b> C	<b>12.</b> C	<b>13.</b> B	<b>14.</b> A	<b>15.</b> C
<b>16.</b> C	<b>17.</b> B	<b>18.</b> D	<b>19.</b> C	<b>20.</b> D

## HINTS & EXPLANATIONS

1. (b) Not Available
2. (d) : In China dish I, iron filings and sulphur powder are mixed without heating so, no new compound is formed and both these substances can be seen separately.  
In China dish II, iron filings react with dilute hydrochloric acid to form a new compound (ferrous chloride) and a colourless, odourless gas (hydrogen) is evolved.  

$$\begin{array}{ccccccc} \text{Fe} + 2\text{HCl}(\text{dil.}) & \longrightarrow & \text{FeCl}_2 & + & \text{H}_2 \\ \text{Iron} & \text{Hydrochloric} & \text{Ferrous} & & \text{Hydrogen} \\ & \text{acid} & \text{chloride gas} & & \end{array}$$
3. (c) : Camphor can be separated from salt by sublimation.
4. (b) : The gas having lowest boiling point i.e., highly volatile will be distilled out first and the gas having highest boiling point i.e., least volatile will be distilled out at the last. So, the correct order of gases distilling out is neon, nitrogen, oxygen, krypton.
5. (d) : Iron reacts with sulphur on heating to form a new compound, iron sulphide which has totally different properties than that of iron and sulphur and cannot be separated into iron and sulphur by normal physical methods.
6. (b) : Iodine being a sublimable solid, sublimes from the mixture of iodine and common salt as violet iodine vapours and condense on the neck of the funnel as violet particles.
7. (c) : Same amount of salt will be recovered as in the process of evaporation only solvent (i.e., water) evaporates and the solute (i.e., salt) is left behind in the beaker in the form of residue.
8. (c) Not Available
9. (a) : The magnetic material 'X' (solid) can be separated from non-magnetic material 'Y' (solid) by magnetic separation method, whereas evaporation method is used to separate solid 'Y' from liquid 'Z' from the homogeneous mixture of 'Y' and 'Z'.
10. (a) : 'X' is magnetic in nature so it is iron. 'Y' is solid i.e., salt which forms a soluble homogeneous mixture with 'Z' which is water. Evaporation method is used to separate salt from the salt-water solution.
11. (c) : 'X' is the water condenser which allows the vapours to cool and condense.
12. (c) : Presence of impurities lowers the melting point and elevates the boiling point of pure substances.
13. (b) Not Available
14. (a) : Ethyl alcohol and water are miscible liquids so, cannot be separated by using separating funnel. This mixture can be separated by distillation method.
15. (c) Not Available
16. (c) Not Available
17. (b) Not Available
18. (d) : Common salt is soluble in 'X' (i.e., water) while sulphur is soluble in 'Y' (i.e., carbon disulphide), both the solutes will be recovered from the filtrate by evaporation. But, coal is insoluble in both. It will be left behind as residue.
19. (c) : Calcium carbonate is insoluble in water hence, it is left behind in the filter paper. Sodium chloride is soluble in water and is obtained by evaporation of solution.
20. (d) : The given experimental set-up shows fractional distillation method. This method is used to separate a mixture of two or more miscible liquids for which the difference in boiling points is less than 25 K.  
Acetone (b.p. 329 K) and water (b.p. 373 K) are separated from their mixture by simple distillation method, as the difference in boiling points is more than 25 K i.e., 44 K.