16. States of matter

Exercises

1 A. Question

Which of the following does not hold good for liquid?

A. They have definite volume

B. They are slightly compressible than solids.

C. Molecules free to move within the substance.

D. They have definite shape and size.

Answer

Liquids contain particles which are free to move within the substance. Therefore liquids are able to flow or one can say that liquids do not have a definite shape. The movement of liquid particles helps to acquire the shape of the container in which it is kept in. They have definite volume due to the intermolecular forces of attraction, and are slightly compressible than solids.

1 B. Question

Which of the following is not a pure substance?

A. Common salt

B. Sugar

C. Rain water

D. Iron

Answer

Common salt, sugar belongs to the category of compounds which are pure substances. Iron is an element which is a pure substance. Rain water is a mixture of water and certain minerals, and mixtures are classified under impure substances.

1 C. Question

The component which is not present in air is

A. Nitrogen

B. Oxygen

C. Carbon dioxide

D. Chlorine

Answer

Air is a homogenous mixture which contains approximately 78% nitrogen, 21% oxygen and about 0.04% carbon dioxide. Hence the component which is absent in air is chlorine.

1 D. Question

Butter is an example for

A. Liquid in solid

B. Solid in liquid

C. Liquid in liquid

D. Solid in solid.

Answer

Butter is colloidal in nature belonging to the category of gels. This means that the dispersed phase is liquid and the dispersing medium is solid. In short, butter is an example for liquid in solid.

2 A. Question

Answer the following questions.

Write any four differences between solids, liquids and gases

Answer

Property	Solid	Liquid	Gas
Arrangement of particles	Particles of solid are tightly packed	Particles are free to move within the substance. The kinetic energy of the particles is greater than that of solids	Particles are not fixed to a position and are more free to move within the substance when compared to liquids.
Shape	Have a definite shape	Assume the shape of container	Does not have a definite shape
Volume	Have definite volume	Have definite volume	Does not have a definite volume
Density	High density	Less than that of solids	Very low density

2 B. Question

Answer the following questions.

Differentiate between homogeneous and heterogeneous solution with an example to each.

Answer

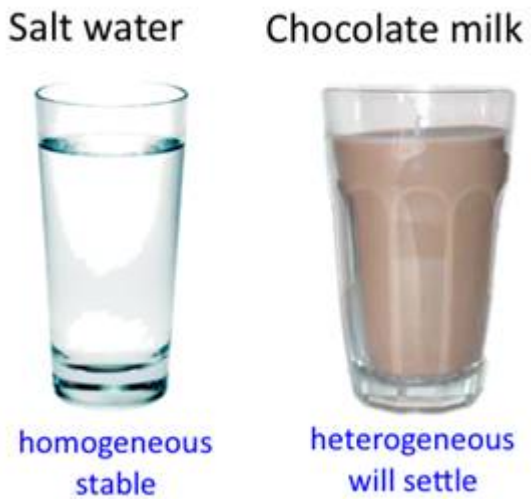
Homogenous solutions are mixtures in which the composition of the constituents is uniform throughout. The constituent particles cannot be distinguished using naked eye or microscope.

Example: Brine solution

Heterogeneous solutions are mixtures in which the constituent particles do not mix uniformly. The constituent particles are visible to naked eye and can be separated easily.

Example: Mixture of water and oil

The diagram is shown below:



2 C. Question

Answer the following questions.

Give an example to each of the following.

a. Suspension b. Colloidal solution.

Answer

(a) The suspension is a type of heterogeneous mixtures in which the solute particles do not dissolve but remain suspended throughout the bulk of the medium.

Example: Mixture of water and chalk dust

(b) The colloidal solution is a type of heterogeneous mixtures in which a material is evenly suspended in a liquid. The particle size of colloids is greater than that of true solutions but less than that of suspensions.

Example: Milk

2 D. Question

Answer the following questions.

Define:

a. Tyndall effect

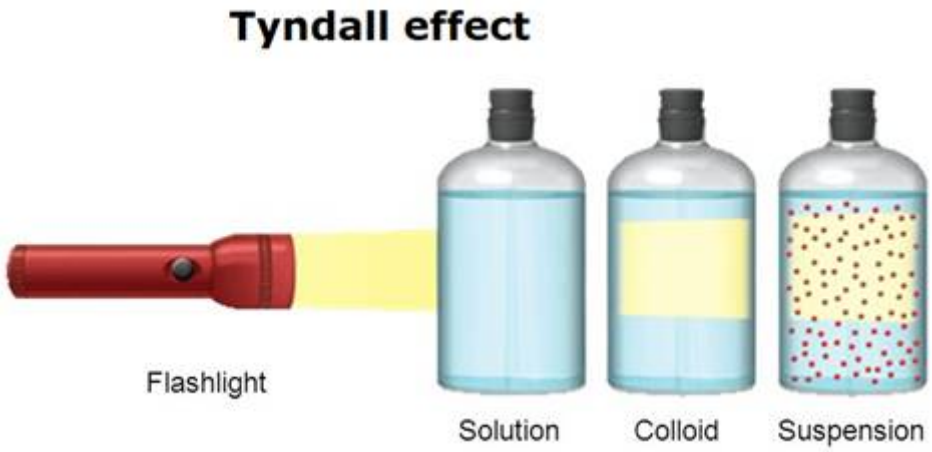
b. Brownian movement.

Answer

a. The phenomenon of scattering of a beam of light by the colloids is called Tyndall effect. Tyndall effect is observed when sunlight passes through the canopy of a dense forest.

b. The random zig-zag motion of colloidal particles suspended in a liquid or gas medium is called Brownian movement or Brownian motion. This random motion is caused due to the collision of the colloidal particles with the particles of the medium.

The diagram is shown below:



2 E. Question

Answer the following questions.

Give any two examples of solvents other than water.

Answer

Solvents are substances which dissolve the solute particles in it. The solvent is present in large quantities when compared to the solute.

Water is a good solvent. Petrol, alcohol are examples of other solvents.

3 A. Question

Give a scientific reason for the following:

Gases do not have a definite shape and volume.

Answer

The particles in gases are bound by weak intermolecular forces of attraction. Therefore the particles have high kinetic energy and can move freely in the space available to them. Thus gases do not have a definite shape and volume.

3 B. Question

Give a scientific reason for the following:

Ornamental gold is an example for the homogeneous mixture.

Answer

Ornamental gold (the most popular one is 22-carat gold) consists of both gold and copper. The composition of gold and copper is uniform throughout in ornamental gold and cannot be distinguished using naked eyes or microscope. So, ornamental gold is said to be a homogeneous mixture.

3 C. Question

Give a scientific reason for the following:

A mixture of sand and iron fillings is a heterogeneous mixture.

Answer

The composition of a mixture containing sand and iron fillings is not uniform. Also, the sand and iron fillings can be easily distinguished using naked eyes and can be separated easily. Such mixtures are called heterogeneous mixtures.

3 D. Question

Give a scientific reason for the following:

Water is called the universal solvent

Answer

Water can dissolve a large number of substances in it. Also, it is the only liquid that can dissolve a most number of substances than any other solvent.

This is the reason why water is called the universal solvent.

3 E. Question

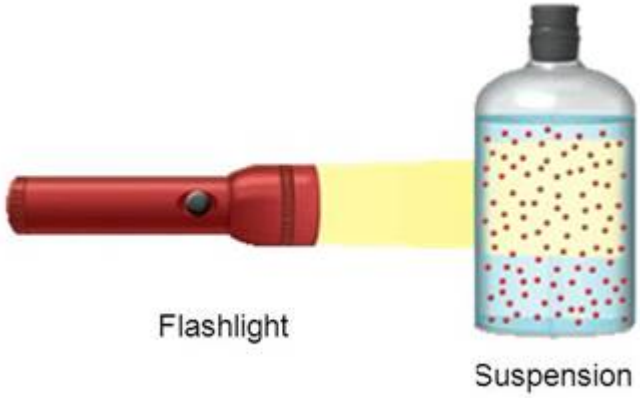
Give a scientific reason for the following:

When a beam of light is passed through a suspension, its path is visible.

Answer

The size of particles of a suspension is large. So, when a beam of light is passed through a suspension, these particles scatter the light beam making its

path visible (as shown in the diagram below)



4. Question

Match the following:

1. Sodium chloride	a) Impure substance
2. Milk	b) Suspension solution
3. Air	c) Pure substance
	d) Mixture

Answer

1-(c), 2-(a), 3-(d)

Explanation:

Sodium chloride is a compound formed by the elements sodium and chlorine.

Compounds belonging to the class of pure substances.

Milk is a colloid and colloids are heterogeneous mixtures which fall under the category of impure substances.

Air is a homogenous mixture consisting of various gases mixed uniformly such that one cannot distinguish the components of the mixture with naked eye or microscope.