# 2. Is Matter Around us Pure

**Very Short Answer Type Questions-Pg-56**

**1. Question**

State whether the following statement is true or false:

Milk is a pure substance.

**Answer**

False,

**2. Question**

Name three mixtures found in nature.

**Answer**

(i) Milk

(ii) Mixture of different colours - Paint

(iii) Mixture of different gases-Air.

**3. Question**

Which of the following is a mixture?

Salt, Air, Water, Alum, Sugar

**Answer**

Air is made of different gases. Hence air is a mixture of gases.

**4. Question**

Name one metal and one non-metal which exist as liquids at room temperature.

**Answer**

Metal - Mercury exists as liquid at room temperature.

Non-metal - bromine exists as liquid at room temperature.

**5. Question**

Name a metal which is soft and a non-metal which is hard.

**Answer**

Soft Metal - Sodium.

Hard non-metal - Diamond.

**6. Question**

Name a non-metal which is a good conductor of electricity.

**Answer**

Diamond is a non-metal which is a good conductor of electricity.

**7. Question**

Name a liquid which can be classified as a pure substance and conducts electricity.

**Answer**

Mercury is a pure substance (non-metal) and conducts electricity.

**8. Question**

Name one solid, one liquid and one gaseous non-metal.

**Answer**

Solid non-metal

Liquid non-metal - Bromine

Gaseous non-metal - Hydrogen

**9. Question**

Name the property:

(a) Which allows metals to be hammered into thin sheets.

(b) Which enables metals to be drawn into wires.

**Answer**

(a) Malleability is the property which allows metals to be hammered into thin sheets. For example- Aluminum.

(b) Ductibility is the property which allows metals to be drawn into wires. For example - Copper.

**10. Question**

Which type of elements, metals or non-metal show the property of brittleness?

**Answer**

Non-metals show the property of brittleness. A material is brittle if, when subjected to stress, it breaks without significant plastic deformation.

**11. Question**

What is meant by saying that metals are malleable and ductile?

**Answer**

Malleable metals, like copper and nickel, are able to be stretched out into thin wires. This is known as Malleability.

Copper, nickel and tin are a few metals that are able to be pounded into thin sheets and able to be made into thin wires. This is known as Ductility.

When atoms move in different ways and can be pounded or stretched, they are both malleable and ductile.

**12. Question**

What is meant by saying that non-metals are brittle?

**Answer**

Non-metals show the property of brittleness. A material is brittle if, when subjected to stress, it breaks without significant plastic deformation.

**13. Question**

What is meant by saying that metals are sonorous?

**Answer**

Metals produce ringing sound when beaten, i.e. metals are sonorous. This is the reason that bells are made of metal.

**14. Question**

What is meant by saying that metals are lustrous?

**Answer**

Metals are lustrous because of the presence of free electrons. ... These electrons can freely move about the surface of metal and are therefore called mobile electrons. Because of these mobile electrons, light falling on the surface of a metal is not transmitted but is reflected, and hence the metals appear lustrous.

**15. Question**

What is the general name of the materials which contain at least two pure substances and show the properties of their constituents?

**Answer**

Substances which are made of two or more materials and which can be separated by physical methods are known as mixtures, such as mixture of salt and water, mixture of sugar and water, mixture of different gases, air, etc. In a mixture, components do not combine chemically or through any chemical change. In a mixture, components do not lose their properties.

**16. Question**

“The properties of the product are different from those of the constituents”. State whether this statement best describes an element, a compound or a mixture.

**Answer**

The properties of a compound are entirely different from those of its constituents. Hence above statement describes a compound.

**17. Question**

Name one element, one compound and one mixture.

**Answer**

Element- Nitrogen

Compound- Water

Mixture- Air

**18. Question**

What is the major difference between a solution and an ordinary mixture?

**Answer**

Mixture of two or more substances with one phase only, i.e. having no distinct boundary of constituent particles are called solution. For example, solution of sugar and water, solution of salt and water, lemonade, soft drinks, etc. Solution is a homogeneous mixture of two or more substances an ordinary mixture is made up of two or more matters and which can be separated by physical methods, such as mixture of different gases, air. In a mixture, components do not combine chemically or through any chemical change.

**19. Question**

What name is given to those elements which are neither good conductors of electricity like copper nor insulators like sulphur?

**Answer**

Some element have intermediate properties of the metals and non-metals. The elements which exhibit the properties of metals as well as non-metals, are called metalloids. Example: Boron, Silicon, Germanium etc.

**20. Question**

Fill in the following blanks with suitable words:

(a) An element is made up of only one kind of ……..

(b) Brine is a ……. whereas alcohol is a ……..

(c) Brass is an alloy which is considered a ……..

(d) The three important metalloids are ……..

(e) The elements which are sonorous are called ……..

**Answer**

(a) atoms

(b) mixture; compound

(c) mixture

(d) boron; silicon; germanium

(e) metals

**Short Answer Type Questions-Pg-57**

**21. Question**

Classify the following into elements and compounds:

(i) $H_2O$ (ii) He (iii) $Cl_2$ (iv) CO (v) Co

**Answer**

Elements- Substances that are made of only one element are called elements, He, Cl, Co.

Compounds- Substances that are made of one or more elements by chemical combination are called compounds. $H_2O$ and CO.

**22. Question**

Classify the following as elements or compounds:

Iron, Iron sulphide, Sulphur, Chalk, Washing soda, Sodium, Carbon, Urea

**Answer**

Elements: Iron, Sodium, Sulphur and carbon.

Compounds: Iron sulphide, chalk, washing soda and urea.

**23. Question**

What elements do the following compounds contain?

Sugar, Common salt

**Answer**

Chemical formula of Sugar is $C_{12}H_{22}O_{11}$. It contains C, H and O Elements
Chemical formula of Common salt is sodium chloride, NaCl. It contains Na and Cl elements.

**24. Question**

What are pure substances? Give two examples of pure substances.

**Answer**

A sample of matter containing only one substance is called a pure substance. In other words all constituents of the substance are same in their chemical nature. A pure substance contains only one kind of atoms or molecules. It is perfectly homogenous. The two examples are Hydrogen and Sodium.

**25. Question**

What are the two types of pure substance? Give one example of each type.

**Answer**

The two types of pure substances are-

(i) Elements- Hydrogen

(ii) Compounds- Water

**2. Question**

Which of the following are 'pure substance'?

Ice, Milk, Iron, Hydrochloric acid, Calcium oxide, Mercury, Brick, Wood, Air

**Answer**

Ice, iron, hydrochloric acid, calcium oxide and mercury are the pure substances whereas milk, brick, wood and air are impure substances.

**27. Question**

What is the other name for impure substances? Give two examples of impure substances.

**Answer**

Mixture is the other name to describe impure substances. For example- Milk and Air.

**29. Question**

Which of the following substances are elements?

Water, Salt, Mercury, Iron, Marble, Diamond, Wood, Nitrogen, Air, Graphite, Hydrogen, Oxygen, Sugar, Chlorine

**Answer**

Elements: Mercury, iron, diamond, nitrogen, Graphite, hydrogen, oxygen and Chlorine.

**29. Question**

State three reasons why you think air is a mixture and water is a compound.

**Answer**

Air is a homogeneous mixture of a number of gases. It's two main constituents of gases are oxygen (21%) and Nitrogen (78%)

The constituent particles of homogenous mixture cannot be separated using centrifugation or decantation.

**30. Question**

Name two solid, two liquids and two gaseous elements at the room temperature.

**Answer**

Solid elements- Sodium and Copper.

Liquid elements- Mercury and bromine

Gaseous elements- Hydrogen and oxygen.

**31. Question**

Explain why, hydrogen and oxygen are considered elements whereas water is not considered an element.

**Answer**

Hydrogen and oxygen are made up of same kind of atom hence these are considered as elements whereas water is made by the combination of different kinds of atoms such as hydrogen and oxygen, hence it is called as a compound and not an element.

**32. Question**

What are the three groups into which all the elements can be divided? Name two elements belonging to each group.

**Answer**

Elements can be classified as metals, non-metals and metalloids.

Examples of metals- Copper and Aluminium.

Non-metals - Hydrogen, Oxygen.

Metalloids - Boron, Silicon.

**33. Question**

State two physical properties on the basis of which metals can be distinguished from non-metals.

**Answer**

Two physical properties that differentiate metals from non-metals are-

(i) Metals, except **mercury & gallium** are **solids** at room temperature while non-metals, except bromine are **solids or gases** at room temperature.

(ii) Metals are **malleable** and **ductile** while non-metals are non-malleable & non-ductile

(iii) Metals are lustrous while non-metals, except diamond & graphite which are allotropes of carbon as well as iodine, are non-lustrous.

**34. Question**

Compare the properties of metals and non-metals with respect to (i) malleability (ii) ductility, and (iii) electrical conductivity.

**Answer**

(i) Metals are malleable i.e. they have ability to be flattened into thin sheets by hammering or rolling such as aluminum whereas non-metals are non-malleable.

(ii) Metals are ductile stretched into wires such as copper whereas non-metals are non-ductile.

(iii)Metals are good conductors of heat & electricity. Exception: Lead & mercury are poor conductors of heat. Non-metals are poor conductors of heat and electricity. Exception: Graphite conducts electricity.

**35. Question**

State any two properties for believing that aluminium is a metal.

**Answer**

Two properties that aluminium is a metal:

(i) Aluminium is malleable i.e. it has ability to be flattened into thin sheets by hammering or rolling.

(ii) Aluminium is good conductor of heat and electricity.

**36. Question**

Give reason why:

(a) copper metal is used for making electric wires.

(b) graphite is used for making electrode in a dry cell

**Answer**

(a) Copper metal is ductile in nature, i.e. it can be drawn into wires. Hence copper metal is used for making electric wires.

(b) Non-metals are poor conductors of heat and electricity. Graphite is an exception in non-metals that conducts electricity. Hence, graphite is used for making electrode in a dry cell

**37. Question**

How would you confirm that a colourless liquid given to you is pure water?

**Answer**

In order to distinguish pure water from impure solutions(mixture), we should evaporate them separately. The liquid which evaporates completely, leaving no residue, is a pure compound. On the other hand, the liquid which leaves behind a residue in evaporation, is a solution or mixture.

**38. Question**

Choose the solutions from among the following mixtures:

Soil, Sea-water, Air, Coal, Soda-water

**Answer**

Sea-water and Soda-water are the solutions from following mixtures.

**39. Question**

Is air a mixture or a compound? Give three reasons for your answer.

**Answer**

Air is considered a mixture because of the following reasons:

(i) Air can be separated into its constituents like oxygen, nitrogen, etc., by the physical process of fractional distillation.

(ii) Air shows the properties of all the gases present in it. For example, oxygen supports combustion and air also supports combustion; carbondioide turns lime water milky and air also turns lime water milky, though very, very slowly.

(iii) Air has a variable composition because air at different places contains different amounts of the various gases.

**40. Question**

Give two reasons for supposing that water is a compound and not a mixture.

**Answer**

Water is considered a compound because of the following reasons-

(i) Water cannot be separate into its constituents, hydrogen and oxygen, by the physical methods.

(ii) The properties of water are entirely different from those of its constituents, hydrogen and oxygen. For example, water is a liquid whereas hydrogen and oxygen are gases; water does not burn whereas hydrogen burns; water does not support combustion whereas oxygen supports combustion.

**41. Question**

Define a compound. Give two points of evidence to show that sodium chloride is a compound.

**Answer**

A compound is a substance made up of two or more elements chemically combined in a fixed proportion by weight.

Evidence to show that sodium chloride is a compound-

(i) Common salt, Sodium chloride is a compound made up of two elements, sodium and chlorine.

(ii) If a magnet is put in the sodium chloride compound, sodium does not get separated from chloride. A compound cannot be separated into components by

physical methods.

**42. Question**

Define a mixture. Give two points of evidence to show that sugar solution is a mixture.

**Answer**

A mixture is a substance which consists of two or more elements or compounds not chemically combined together.

Two evidences to show that sugar solution is a mixture-

(i) A mixture of sugar in water is a homogeneous mixture because all the parts of sugar solution have the same sugar water composition and appears to be equally sweet.

(ii) There is no visible boundry of separation between sugar and water particles in a sugar solution.

**43. Question**

State two reasons for supposing that brass is a mixture and not a compound.

**Answer**

Brass is a mixture and not a compound because in compound the elements should be in definite proportions and the elements are chemically bonded to each other.Whereas in brass the two elements Zn & Cu are not in definite proportions (they can mix in any ratio) & there is no chemical bonding between them.

**44. Question**

List five characteristics by which compounds can be distinguished from mixtures.

**Answer**

**COMPOUND**1). It is a pure substance.2). It cannot be separated by physical method.3). Element loose their properties in a compound.4). Its composition is fixed throughout its mass.5). It has fixed melting point.**MIXTURE**1). It is an impure substance.2). It can be separate by physical method.3). Substances forming mixture retain their properties.4). It has no fixed composition.5). It has no sharp melting point.

**45. Question**

Explain why, a solution of salt in water is considered a mixture and not a compound.

**Answer**

(i) A mixture of salt in water is a homogeneous mixture because all the parts of salt solution have the same salt water composition and appears to be equally salty.

(ii) There is no visible boundary of separation between salt and water particles in a salt solution.

**46. Question**

State one property in which a solution of sugar in water resembles a mixture of sugar and sand, and one property in which it differs from it.

**Answer**

there is a visible boundary of separation between salt and water particles in a salt solution.

**47. Question**

You are given two liquids, one a solution and the other a compound. How will you distinguish the solution from the compound?

**Answer**

(i) In a compound, two or more elements are chemically bound together. However, in a solution, there are few substances that do not chemically bound together as compounds do (molecules or compounds in a solution may have weak interactions between them, but it is different from the chemical binding of elements in compounds).

(ii) In a compound, elements are present in defined ratio, but in a solution, the components in it have not necessarily to be present in definite amounts.

(iii) The components in a solution can be separated in physical methods, but in a compound, this cannot be done. They may be separated by chemical means.

(iv) Compared to compounds, solutions have two phases called solutes and the solvent.

**48. Question**

Name a non-metal:

(a) which is lustrous

(b) which is required for combustion

(c) whose one of the allotropic forms is a good conductor of electricity. Name the allotrope

(d) other than carbon which shows allotropy

(e) which is known to form the largest number of compounds

**Answer**

(a) Iodine is lustrous in nature.

(b) Oxygen is necessary for combustion.

(c) Carbon is the non-metal whose allotrope Graphite, is a good conductor of electricity.

(d) Sulphur also shows allotropy.

(e) Carbon is the element to form largest number of compounds.

**49. Question**

Name a metal:

(a) which can be easily cut with a knife

(b) which form amalgams

(c) which has no fixed shape

(d) which has a low melting point

(e) which is yellow in colour

**Answer**

(a) Sodium is a soft metal which can be easily cut with a knife.

(b) Mercury can form amalgams.

(c) Mercury has no fixed shape as it is a liquid.

(d) Sodium has a low melting point.

(e) Gold is yellow in colour.

**50. Question**

Which of the following are not compounds?

Chlorine gas, Potassium chloride, Iron powder, Iron sulphide, Aluminium foil, Iodine vapour, Graphite, Carbon monoxide, Sulphur powder, Diamond

**Answer**

Chlorine gas, Aluminium foil, Graphite, Sulphur powder and diamond are elements.

Air is needed for the combustion (or burning) of fuels. Which component of air actually supports combustion?

Air shows the properties of all the gases present in it. Oxygen present in it supports combustion and hence air is needed for combustion.

**Long Answer Type Questions-Pg-58**

**51 A. Question**

State the main points of difference between homogeneous and heterogeneous mixtures.

**Answer**

| Homogenous Mixture | Heterogeneous Mixture |
|---|---|
| **1**. Constituents have uniform composition throughout the mixture. | **1**. Constituents have non-uniform composition throughout mixture. |
| **2**. Air, blood, saturated sugar, water solution, alloys are examples of homogenous mixture. | **2**. Rock, oil and water, Mixture of Iron filling and Sulphur. |
| **3**. Particles Not visible to unaided eye. | **3**. Particles may be visible to unaided eye. |
| **4**. All solutions are homogenous mixture. | **4**. All suspensions are heterogeneous mixture. |

**51 B. Question**

Classify the following materials as homogeneous mixtures and heterogeneous mixtures:

Soda-water, Wood, Air, Soil, Vinegar, Alcohol and water mixture, Petrol and water mixture, Chalk and water mixture, Sugar and water mixture, Copper sulphate solution.

**Answer**

Homogeneous mixture- Alcohol and water mixture, Sugar and water mixture,

Heterogeneous mixture- Chalk and water mixture,

**52 A. Question**

What is meant by (i) elements

(ii) compounds, and (iii) mixtures? Write down the names of two elements, two compounds and two mixtures.

**Answer**

(a) (i) Elements- An element is a substance which cannot be split up into two or more simpler substances by the usual chemical methods of applying heat, light or electric energy. Sodium and Hydrogen are two elements.

(ii) Compounds- A compound is a substance made up of two or more elements chemically combined in a fixed proportion by weight. Water and sodium chloride are two compounds.

(v) Mixtures- A mixture is a substance which consists of two or more elements or compounds not chemically combined together. Air and Gun powder are two mixtures.

**52 B. Question**

Classify the following into elements, compounds and mixtures:

Marble, Air, Gold, Brass, Sand, Diamond, Graphite, Petroleum, Common salt, Sea-water, chalk

**Answer**

Elements - Gold, Graphite, Diamond,

Compounds - Common salt, Chalk, Marble

Mixtures - Air, Brass, Petroleum, Sea water, Sand.

**53 A. Question**

What are (i) metals (ii) non-metals, and (iii) metalloids? Give two examples each of metals, non-metals and metalloids.

**Answer**

(i) Metal - A metal is a material (an element, compound, or alloy) that has physical properties: hard, opaque, shiny, and conductivities. Metals are generally malleable, fusible and ductile. Metals are good conductors of heat & electricity.

Example: Aluminium, Copper, Iron, etc.

(ii) Non-Metal- Non-metals are opposite in properties of the metals. The non-metals are brittle, not malleable or ductile, poor conductors of both heat and electricity.

Example: Oxygen, Fluorine, Neon, Chlorine, etc.

(iii) Metalloids - Metalloids are a type of semi-metals, that sometimes behave as a metal and sometimes behave as a non-metal.

Example: Silicon, Germanium etc.

**53 B. Question**

Classify the following into metals, non-metals and metalloids:

Silicon, Mercury, Diamond, Sulphur, Iodine, Germanium, Sodium, Carbon, Magnesium, Copper, Boron, Helium

**Answer**

| Metals | Non-Metals | Mettaloids |
|---|---|---|
| Mercury | Diamond | Silicon |
| Sodium | Sulphur | Germanium |
| Magnesium | Iodine | Boron |
| Copper | Carbon | |
| | Helium | |

**54 A. Question**

What is a mixture? Give two example of mixtures.

**Answer**

A mixture is a substance which consists of two or more elements or compounds not chemically combined together. Air and Gun powder are two mixtures.

**54 B. Question**

What is meant by (i) homogeneous mixtures, and (ii) heterogeneous mixtures? Give two examples of homogeneous mixtures and two of heterogeneous

mixtures.

**Answer**

(i) A homogeneous mixture has a uniform composition throughout its mass. It has no visible boundaries of separation between the various constituents. Mixture of sugar and water and mixture of alcohol and water are two examples of homogeneous mixtures.

(ii) A heterogeneous mixture does not have a uniform composition throughout its mass. It has visible boundaries of separation between the various constituents. A mixture of petrol and water and mixture of chalk in water are two examples of heterogeneous mixtures.

**54 C. Question**

What is the other name of homogenous mixtures?

**Answer**

All the homogeneous mixtures are also called Solutions.

**55 A. Question**

What are the three general classes of matter? Give one example of each type.

**Answer**

On the basis of chemical constitution, all the matter can be classified into three groups:

(i) Elements- An element is a substance which cannot be split up into two or more simpler substances by the usual chemical methods of applying heat, light or electric energy. Sodium and Hydrogen are two elements.

(ii) Compounds- A compound is a substance made up of two or more elements chemically combined in a fixed proportion by weight. Water and sodium chloride are two compounds.

(iii) Mixtures- A mixture is a substance which consists of two or more elements or compounds not chemically combined together. Air and Gun powder are two mixtures.

**55 B. Question**

Draw a flow-chart for the schematic representation of different types of matter.

**Answer**

No Answer

**Multiple Choice Questions (MCQs)-Pg-58**

**56. Question**

Which of the following is not an element?

A. graphite

B. germaniumcc

C. silica

D. silicon

**Answer**

Silica is

**57. Question**

Which of the following are compounds?

(i) CO (ii) No

(iii) NO (iv) Co

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iii)

D. (ii) and (iv)

**Answer**

CO, carbon monoxide and NO, nitrogen oxide are compounds.

**58. Question**

One of the following substances is neither a good conductor of electricity nor an insulator. This substance is:

A. chromium

B. gernmanium

C. gallium

D. potassium

**Answer**

Germanium is neither a good conductor of electricity nor an insulator.

**59. Question**

Which of the following is not a mixture?

A. kerosene

B. air

C. alcohol

D. petrol

**Answer**

Alcohol is a compound made up of carbon, hydrogen and oxygen.

**60. Question**

The element which is not common between the compounds called baking soda and soda ash is

A. Sodium

B. hydrogen

C. oxygen

D. carbon

**Answer**

chemical formula of baking soda is $NaHCO3$ and chemical formula of soda ash is $Na2CO3$ .

**61. Question**

“Is malleable and ductile” best describes:

A. a solution

B. a metal

C. a compound

D. a non-metal

**Answer**

Malleability and ductility are the properties of metals.

**62. Question**

Which one of the following is not a metalloid?

A. boron

B. silicon

C. gallium

D. germanium

**Answer**

Some element have intermediate properties of the metals and non-metals. The elements which exhibit the properties of metals as well as non-metals, are called metalloids. Example Boron, Silicon, Germanium etc.

**63. Question**

The elements which normally exist in the liquid state are:

A. bromine and iodine

B. mercury and chlorine

C. iodine and mercury

D. bromine and mercury

**Answer**

Bromine is a non metal which exists in the liquid state whereas mercury is a metal which exists in the liquid state.

**64. Question**

When a mixture of iron powder and sulphur powder is heated strongly to form iron sulphide, then heat energy is:

A. released

B. first absorbed and then released

C. absorbed

D. neither absorbed nor released

**Answer**

the exothermic reaction of two elements, iron and sulfur, to form the compound, iron sulfide.

**65. Question**

The property/properties which enable copper metal to be used for making electric wires is/are:

A. copper metal is malleable and ductile

B. copper metal is a good conductor of electricity

C. copper metal is ductile and has low electrical resistance

D. copper metal is sonorous and an excellent conductor of electricity

**Answer**

ductility is the property of metals in which they can be drawn into wires.

**66. Question**

On the basis of composition of matter, milk is considered to be:

A. a pure substance

B. an impure substance

C. An element

D. a compound

**Answer**

Milk is the mixture of fat, water, and other constituents.

**67. Question**

Which of the following statements are true for pure substances?

(i) pure substances contain only one kind of particles

(ii) pure substances may be compounds or mixtures

(iii) pure substances have the same composition throughout

(iv) pure substances can be exemplified by all elements other than nickel

A. (i) and (ii)

B. (i) and (iii)

C. (iii) and (iv)

D. (ii) and (iii)

**Answer**

A pure substance contains only one kind of atoms or molecules. It has definite composition which does not vary with time.

**68. Question**

Which of the following are homogeneous in nature?

(i) ice (ii) wood

(iii) soil (iv) air

A. (i) and (iii)

B. (ii) and (iii)

C. (i) and (iv)

D. (iii) and (iv)

**Answer**

ice and air are homogeneous in nature.

**69. Question**

Two chemical substances X and Y combine together to form a product P which contains both X and Y

$X + Y \rightarrow P$

X and Y cannot be broken down into simpler substances by simple chemical reactions. Which of the following statements concerning X, Y and P are correct?

(i) P is a compound

(ii) X and Y are compound

(iii) X and Y are elements

(iv) P has a fixed composition

A. (i), (ii) and (iii)

B. (i), (ii) and (iv)

C. (ii), (iii) and (iv)

D. (i), (iii) and (iv)

**Answer**

No Answer

**70. Question**

Which of the following does not have a fixed melting point/boiling point?

A. gold

B. ethanol

C. air

D. oxygen

**Answer**

Air does not have a fixed melting point/boiling point.

**Questions Based on High Order Thinking Skills (HOTS)-Pg-59**

**71. Question**

In the following set of substances, one item does not belong to the set. Select this item and explain why it does not belong to the set:

Hydrogen, Oxygen, Steam, Chlorine

**Answer**

Steam does not belong to the set. This is because all others are elements whereas steam is a compound.

**72. Question**

Iron powder and sulphur powder were mixed together and divided into two parts A and B. When part A was heated strongly over a burner, then a substance C was formed. The part B was, however, not heated at all. When dilute hydrochloric acid was added to substance C, then gas D was evolved and when dilute hydrochloric acid was added to part B then gas E was evolved.

(a) What type of substance is B?

(b) What type of substance is C?

(c) Name the gas (i) D, and (ii) E?

(d) Write one characteristic property of gas D.

**Answer**

(a) Substance B is a mixture (Fe + S).

(b) Substance C is Compound (Iron sulphide, FeS).

(c) (i) Hydrogen sulphide, $H_2S$

(ii) Hydrogen, $H_2$

(d) Hydrogen sulphide has smell of rotten eggs.

**73. Question**

There are three substances X, Y and Z. The substance X does not have a fixed melting point or boiling point and it still shows the individual properties of its constituents. The substance Y is a pure substance which occurs in nature as such. The substance Y has a fixed melting point and boiling point but it cannot be broken down into simpler substances by any chemical means. The substance Z is also a pure substance whose properties are entirely different from those of its constituents. The substance Z can, however, be divided by electrolysis into two substances which belong to the same class of substances as Y.

(a) What type of substance could X be? Name one substance like X.

(b) What type of substance could Y be? Name one substance like Y.

(c) What type of substance could Z be? Name one substance like Z.

(d) Whish process involves absorption or release of an appreciable amount of energy: formation of substance X or formation of substance Z?

(e) Name the three groups into which all the substances like Y are divided on the basis of their properties.

**Answer**

(a) Mixture; Salt Solution (b) Element; Sulphur

(c) Compound; Water

(d) Formations of Z (which is a compound)

(e) Metals, Non-metals and Metalloids

**74. Question**

There is a large group of materials P which can be divided into three groups Q, R, and S on the basis of their properties. The substances belonging to group Q can be solids, liquids or gases. The solids belonging to group Q are usually electrical insulators. Most of the substances of group R are solids which are good conductors of electricity. The substances belonging to group S are neither insulators like Q nor good conductors like R. The properties of S are intermediate between those of Q and R.

(a) What could the group of materials P be?

(b) Name the substances Q. Give two examples of such substances.

(c) Name the substances R. Write two examples of such substances.

(d) Name the substances S. Give two examples of such substances.

(e) Out of Q, R and S, which substances are malleable and ductile?

**Answer**

(a) Elements

(b) Substances Q are Non-metals; Two examples are Carbon and Sulphur.

(c) Substances R are Metals; Two examples are Sodium and Aluminium

(d) Substances S are Metalloids; Boron and

Silicon (e) Substances R are malleable and ductile as they are metals.

**75. Question**

A, B and C are all liquids. Liquid A has a comparatively low boiling point. On heating, liquid a vaporizes completely without leaving behind any residue. Liquid A is being used increasingly as a fuel in motor vehicles either alone or by mixing with petrol. Liquid B has a very high boiling point. It also vaporizes completely on heating, without leaving any residue. Liquid B is a conductor of electricity and used in making thermometers. Liquid c has a moderate boiling point. On heating, liquid C vaporises leaving behind a white solid D which is used in cooking vegetables. The condensation of vapours from C give a liquid E which turns anhydrous $CuSO_4$ to blue.

(a) Which liquid could be an element? Name this element.

(b) Which liquid could be a mixture? Name this mixture.

(c) Which liquid could be a compound? Name this compound.

(d) What could the solid D be?

(e) What do you think is liquid E?

**Answer**

(a) B; Mercury

(b) C; Salt solution

(c) A; Alcohol

(d) Sodium chloride (Common salt)

(e) Water

**Very Short Answer Type Questions-Pg-79**

**1. Question**

Out of a colloid, solution and a suspension:

(a) which one has the smallest particles?

(b) which one has the largest particles?

**Answer**

(a) A solution has the smallest particles. The size of the solute particles in a true solution is 10-8 cm.

(b) A suspension has the largest particles. The size of the particles in suspension is larger than 10-5 cm.

**2. Question**

What is the name of the clear liquid formed when a solid dissolves in a liquid?

**Answer**

Solution is the name of the clear liquid formed when a solid dissolves in a liquid.

**3. Question**

Which of the two will scatter light: soap solution or sugar solution? Why?

**Answer**

A soap solution will scatter light passing through it as it is a colloid.

**4. Question**

State whether colloidal solutions are homogeneous or heterogeneous.

**Answer**

Though colloids appear to be homogeneous to us but actually they are found to be heterogeneous when observed under a high power microscope.

**5. Question**

What is the most common way of expressing the concentration of a solution?

**Answer**

The most common way of expressing the concentration of a solution is the percentage method. The percentage method refers to the 'percentage of solute' present in the solution.

**6. Question**

How much water should be added to 15 grams of salt to obtain 15 per cent salt solution?

**Answer**

To get 15% of salt solution you need 15g of salt and will add 85g of water so total solution count = solute + solvent = 15g + 85g = 100g.

**7. Question**

How much water should be mixed with 12 ml of alcohol so as to obtain 12% alcohol solution?

**Answer**

To get 12% of alcohol solution you need 12ml of alcohol and will add 88g of water so total solution count = solute +solvent = 12g +88g =100g.

**8. Question**

A 5 per cent sugar solution means that:

(a) 5 g of sugar is dissolved in 95 g of water.

(b) 5 g of sugar is dissolved in 100 g of water.

Choose the correct answer.

**Answer**

(a) 5 g of sugar is dissolved in 95 g of water.

**9. Question**

A 15% alcohol solution means:

(a) 15 ml alcohol and 85 ml water.

(b) 15 ml alcohol and 100 ml water.

Choose the correct answer.

**Answer**

(a) 15 ml alcohol and 85 ml water.

**10. Question**

Calculate the concentration of a solution which contains 2.5 g of salt dissolved in 50 g of water.

**Answer**

Concentration = Mass of solute/Mass of solution × 100

Mass of solute = 2.5g

Mass of solution = 50g

Concentration of a solution = 2.5/ 50 * 100% = 4.7% (w/w)

**11. Question**

What is the concentration of a solution which contains 16 g of urea in 120 g of solution?

**Answer**

Concentration=Mass of solute/Mass of solution×100

Mass of solute = 16g

Mass of solution = 120g

Concentration of a solution = 16 / 120 * 100% = 13.3% (w/w)

**12. Question**

A solution contains 5.6 mL of alcohol mixed with 75 ml of water. Calculate the concentration of this solution.

**Answer**

Volume of the solute (salt) = 5.6 mlVolume of the solvent (water) = 75 mlVolume of the solution = Volume of the solute + volume of the solvent= 5.6 + 75 = 80.6mlVolume percentage of solution = Volume of solute /Volume of solvent x 100%

= 5.6/80.6 x 100 = 6.9%

**13. Question**

If 25 mL of acetone is present in 150 mL of its aqueous solution, calculate the concentration of solution.

**Answer**

Concentration= Volume of solute/Volume of solution×100

Volume of solute = 25ml

Volume of solution =150ml

Concentration of a solution= 25/ 150 * 100% = 16.6% (v/v)

**14. Question**

What happens when the temperature of a saturated sugar solution is increased?

**Answer**

When the temperature of a saturated sugar solution is increased, it become super saturated.

**15. Question**

Which of the following contains less solute at a given temperature and pressure?

Unsaturated solution or Saturated solution

**Answer**

Unsaturated solution contains less solute at a given temperature and pressure.

**16. Question**

State one instance where water undergoes a physical change and one in which it undergoes a chemical change.

**Answer**

When water is cooled, then water solidifies to form ice. This is called freezing of water. The freezing of water to form ice is a physical change.

During electrolysis, when water forms hydrogen and oxygen, it undergoes chemical change.

**17. Question**

State whether the following statements are true or false:

(a) Bread is an example of solid foam.

(b) Sponge is an example of solid sol.

What type of colloids are bread and sponge?

**Answer**

(a) True (b) False

**18. Question**

Choose one term from the following which includes the other three:

Aerosol, emulsion, colloid, sol

**Answer**

Colloid is the term which includes aerosol, emulsion and sol.

**19. Question**

Which of the following is a sol?

Saving cream, Milk, Fog, Soap solution, Hairspray

**Answer**

Soap solution

**20. Question**

Fill in the following blanks:

(a) Milk is a …….. solution but vinegar is a ……. solution.

**Answer**

(a) colloidal; true

**Short Answer Type Questions-Pg-80**

**21. Question**

Define (a) solute, and (b) solvent

**Answer**

(a) The substance which is dissolved in a liquid to make a solution is called solute.

(b) The liquid in which solute is dissolved is known as solvent.

**22. Question**

What is the difference between solutions and colloids?

**Answer**

| S. No. | True solutions | Colloidal solutions |
|---|---|---|
| 1 | Particle size is of the order of molecular size i.e 10A° | Particle size ranges from 10A°- 2000A°. |
| 2 | Particles are invisible under all circumstances i.e. even under a microscope. | Particles can be observed under a powerful microscope. |
| 3 | True solutions pass easily either through a filter paper or even a parchment membrane. | Colloidal solutions pass easily through filter paper but slowly through a parchment membrane. |
| 4 | Do not scatter light. | These particles can scatter light. known as Tyndall effect. |

**23. Question**

What is the difference between colloids and suspensions?

**Answer**

| Colloidal solutions | Suspensions |
|---|---|
| Particle size ranges from 10A°- 2000A°. | Particle size is greater than 2000A°. |
| Particles can be observed under a powerful microscope. | Particles are visible under a microscope. In case of particles such as sand they are visible even to naked eye. |
| Colloidal solutions pass easily through filter paper but slowly through a parchment membrane. | Suspensions cannot pass through either filter paper or parchment membrane. |
| These particles can scatter light. known as Tyndall effect. | Do not show Tyndall effect. |

**24. Question**

In what respects does a true solution differ from a colloidal solution?

**Answer**

The difference in the properties of a true solution and a colloid is due to the different size of their solute particles. The solute particles in a true solution are very small whereas the solute particles in a colloid are slightly bigger.

**25. Question**

Classify the following into true solutions and colloidal solutions:

Ink, Salt solution, Starch solution, Blood, Sugar solution

**Answer**

True solutions- Salt solution, Sugar solution.

Colloidal- Ink, Starch solution, Blood.

**26. Question**

How will you test whether a given solution is a colloidal solution?

**Answer**

We can distinguish between colloids and true solutions by using Tindall effect. If the solution scatters a beam of light passing through it and renders its path visible, will be a colloid.

**27. Question**

Explain what happens when a beam of light is passed through a colloidal solution.

**Answer**

When a beam of light is passed through a colloidal solution such as a soap solution, it scatters a beam of light passing through it and renders its path visible.

**28. Question**

How will you distinguish a colloid from a solution?

**Answer**

We can distinguish between colloids and true solutions by using Tindall effect. If the solution scatters a beam of light passing through it and renders its path visible, will be a colloid.

The solution which does not scatter a beam of light passing through it and does not render its path visible, will be a true solution.

**29. Question**

How will you differentiate between a suspension and a colloid?

**Answer**

it is due to the small size of their solute particles that a colloid easily pass through the pores of a filter paper whereas it is because of the bigger size of the solute particles of a suspension that they cannot pass through the pores of a filter paper and are retained on the filter paper in the form of a residue. Only the solvent of a suspension passes through the filter paper.

**30. Question**

You have been given a suspension and a solution. How could you tell the difference between them by their appearance?

**Answer**

The size of solid particles in a suspension is quite large. The size of particles in a suspension is larger than 10-5 cm. In a suspension, the particles do not dissolve in the liquid. The particles of a suspension are big enough to be seen with a naked eye.

**31. Question**

Which of the following will show Tyndall effect? Why?

(a) Salt solution (b) Starch solution

(b) Milk (d) Copper sulphate solution

**Answer**

(b) Milk will show tyndall effect, it scatters a beam of light passing through it and renders its path visible as it is a colloid. The scattering of light by colloidal particles is called tyndall effect.

**32. Question**

Name the different types of solutions. Give one example of each.

**Answer**

Solid - solid solution – Solution of two or more solids are generally known as solid-solid solution. For example – alloys.

Solid – Liquid solution – Solution of solid and liquid is called solid-liquid solution. For example - solution of salt and water.

Liquid – liquid solution – Solution of two miscible liquids are called liquid-liquid solution, such as solution of water and acetic acid. The solution of acetic acid in water is known as vinegar.

Gas - liquid solution – Solution of gas into liquid is called gas-liquid solution. For example – Soft drink.

Gas-gas solution – Solution of two or more gas is called gas-gas solution. For example – air, which is the solution of many gases, such as hydrogen, oxygen, carbon dioxide, etc.

**33. Question**

Classify the following into solution, suspensions and colloids:

Soda-water, Milk, Brine, Blood, Ink, Smoke in air, Chalk water mixture, Milk of Magnesia, Shaving cream, Muddy river water.

**Answer**

Solutions- Brine, Soda water.

Suspensions- Muddy river water, Chalk water mixture, Milk of magnesia, Smoke in air.

Colloids- Milk, Ink, Blood, shaving cream.

**34. Question**

Define the following:

(a) Sol

(b) Aerosol

(c) Emulsion

(d) foam

**Answer**

(a) Colloidal solution is called sol when liquid is dispersing medium and solid is dispersed phase. For example – blood, ink, paint, etc.

(b) When particles of solid or liquid dispersed in gaseous medium, the mixture is known as Aerosol. For example – cloud, smog, smoke etc.

(c) Colloidal solution is called emulsion, when dispersing medium and dispersed phase both are liquid. For example – milk, butter, face cream, etc.

(d) Mixtures are called foam when liquid is present as dispersing medium and gas is dispersed medium. For example – shaving cream, soap bubbles, etc.

**35. Question**

What is meant by the concentration of a solution?

**Answer**

The concentration of a solution is the amount of solute present in a given quantity of the solution.

**36. Question**

What will happen if a saturated solution is : (i) heated, and (ii) cooled?

**Answer**

(i) When saturated solution is heated, it will become unsaturated

(iii) When saturated solution is cooled, some of the dissolved solute will separate and crystallizes.

**37. Question**

21.5 g of sodium chloride dissolves in 60 g of water at 25°C. Calculate the solubility of sodium chloride at that temperature.

**Answer**

21.5g of NaCl dissolves in 60g of water

So amount of NaCl which gets dissolved in 100gm of water=21.5x100/60=35.8

The solubility of sodium chloride is 35.8 at 25C.

**38. Question**

9.72 g of potassium chloride dissolves in 30 g of water at 70°C. Calculate the solubility of potassium chloride at that temperature.

**Answer**

9.72g of KCl dissolves in 30g of water

So amount of KCl which gets dissolved in 100gm of water=9.72x100/30=32.4

The solubility of potassium chloride is 32.4 at 70C.

**39. Question**

Classify the following as physical or chemical changes:

(i) Cooking of food

(ii) Boiling of water

(iii) Cutting of trees

(iv) Dissolving salt in water

(v) Digestion of food

(vi) Melting of ice

**Answer**

(i) Cooking of food- Chemical change

(ii) Boiling of water- physical change

(iii) Cutting of trees- Physical change

(iv) Dissolving salt in water- Physical change

(v) Digestion of food- Chemical change

(vi) Melting of ice- physical change.

**40. Question**

Which of the following are physical changes and which are chemical changes?

(a) Burning of a magnesium wire

(b) Freezing of water

(c) Rusting of iron

(d) Glowing of an electric bulb

**Answer**

(a) Burning of a magnesium wire-Chemical change

(b) Freezing of water- Physical change

(c) Rusting of iron- Chemical change

(d) Glowing of an electric bulb- Physical change

**41. Question**

Classify the following as physical or chemical changes:

(i) Formation of curd from milk

(ii) Condensation of steam

(iii) Growth of a plant

(iv) Breaking of a glass tumbler

**Answer**

(i) Formation of curd from milk-Chemical change

(ii) Condensation of steam- Physical change

(iii) Growth of a plant- Chemical change

(iv) Breaking of a glass tumbler- physical change

**42. Question**

Separate the following into physical and chemical changes:

Sublimation of a solid, Decomposition of water into hydrogen and oxygen by passing electric current,

Formation of clouds, Making a fruit salad from raw fruits, Dissolving carbon dioxide in water.

**Answer**

Physical changes- Sublimation of a solid, Formation of clouds, Making a fruit salad from raw fruits, Dissolving carbon dioxide in water.

Chemical changes- Decomposition of water into hydrogen and oxygen by passing electric current

**43. Question**

Which of the following are physical changes and which are chemical changes?

Burning of candle wax, Melting of candle wax, Mixing of iron filings and sand, Burning of wood, Breaking a piece of chalk, Burning a piece of paper, Cutting a piece of paper

**Answer**

Physical changes- Melting of candle wax, Mixing of iron filings and sand, Breaking a piece of chalk, Cutting a piece of paper

Chemical changes- Burning of candle wax, Burning of wood, Burning a piece of paper.

**44. Question**

The 'sea water' can be classified as a homogeneous mixture as well as a heterogeneous mixture? Comment.

**Answer**

Sea water is the mixture of many salts, water and other many impurities. Apart from these many gases are also dissolved in sea water. Because of salt and some other bigger size of impurities sea water is classified as heterogeneous mixture. Because of mixture of several gases in sea water it is also classified as homogeneous mixture.

**45. Question**

Which of the following do not exhibit Tyndall effect?

Starch solution, Sugar solution, Ink, Salt solution, Copper sulphate solution, Ammonium chloride solution, Fog, Smoke, Car exhausts.

**Answer**

Sugar solution, salt solution, Copper sulphate solution.

**Long Answer Type Questions-Pg-81**

**46 A. Question**

(a) What is a physical change? Give two examples of physical changes.

**Answer**

Physical changes : Those changes in which no new substances are formed, are called physical changes. In a physical change the substances involved do not change their identity. They can be easily returned to their original form by some physical process. The changes in physical state, size and shape of a substances are called physical changes. Example: When ice is heated it melts to form water, Boiling of water, condensation of steam

**46 B. Question**

What is a chemical change?

Give two examples of chemical changes.

**Answer**

Those changes in which new substances are formed, are called chemical changes. A chemical change is also called a chemical reaction. In a chemical change, the substances involved, change their identity . They get converted into entirely new substances. The new substances usually cannot be returned to their original form. This means that chemical changes are usually irreversible.

Burning of candle and burning of hydrogen in oxygen to form water.

**47 A. Question**

Give the main differences between physical changes and chemical changes.

**Answer**

Physical Change Chemical Change

(1). New substances are not formed 1. New substances are formed

(2). A physical change is a temporary change 2. A chemical change is a permanent change

(3). A physical change is easily reversible 3. A chemical change is usually irrerversible.

(4). The mass of substances does not alter in a 4. The mass of substance does alter in a physical change. chemical change

**47 B. Question**

Which of the following are chemical changes and which physical? Give reason.

(i) a glass bottle breaking

(ii) coal burning in air

(iii) making a cake

(iv) wool being knitted into a sweater

**Answer**

(i) a glass bottle breaking- Physical change

(ii) coal burning in air- Chemical change

(iii) making a cake- Chemical change

(iv) wool being knitted into a sweater- Physical change

**48 A. Question**

(a) Define solubility of a substance. How does it vary with temperature?

**Answer**

Solubility is the amount of solute in a saturated solution at a given temperature. In other words, maximum capacity to dissolve a solute in a solution at a given temperature is called solubility. Different solvents can dissolve different amount of solute. This means different solvents have different solubility.

**48 B. Question**

What do you understand by the statement "the solubility of copper sulphate in water at 20°C is 20.7 g'?

**Answer**

No Answer

**48 C. Question**

What is the effect of temperature on the solubility of solids in liquids?

**Answer**

Solubility increases with increase in temperature

**49 A. Question**

What is meant by a solution? Give two examples of solutions.

**Answer**

A solution is a homogeneous mixture of two or more substances. E.g. Salt solution, Sugar solution.

**49 B. Question**

What is a suspension? Give two examples of suspensions.

**Answer**

A suspension is a heterogeneous mixture in which the small particles of a solid are spread throughout a liquid without dissolving in it. E.g. Chalk water mixture, muddy water.

**49 C. Question**

What is a colloid? Give two examples of suspensions.

**Answer**

A colloid is a kind of solution in which the size of solute particles is bigger than that of a true solution but smaller than that of a suspension. E.g. milk and ink.

**50 A. Question**

(a) Differentiate between a saturated and an unsaturated solution. How will you test whether a given solution is saturated or not?

**Answer**

Saturated Solution: When a solution cannot dissolve more solute at a given temperature, the point is called saturation point of the solution and solution is called saturated solution. This means, no more solute can be dissolved in a saturated solution at a given temperature.

Unsaturated Solution: Solution in which more solution can dissolved at a given temperature, is called unsaturated solution.

Example to test whether a given solution is saturated or not

At 25°C, 55 g of common salt dissolves in 100g of water. However, if more of common salt is added to the above solution, it just does not dissolve. In such a situation, the solution of common salt containing 55 gm of salt in 100 gm of water, is a saturated solution at 25°C

**50 B. Question**

How would you prepare a saturated solution of sodium chloride in water at 25°C? What will happen if this solution is cooled to 10°C?

**Answer**

At 25°C, 55 g of common salt dissolves in 100g of water. However, if more of common salt is added to the above solution, it just does not dissolve. In such a situation, the solution of common salt containing 55 gm of salt in 100 gm of water, is a saturated solution at 25°C

**Multiple Choice Questions (MCQs)-Pg-81**

**51. Question**

One of the following is a solid foam. This one is:

A. butter

B. bread

C. shaving cream

D. ruby

**Answer**

Bread is an example of solid foam.

**52. Question**

Which of the following is not an emulsion?

A. milk

B. butter

C. face cream

D. shaving cream

**Answer**

Shaving cream is , whereas face cream, milk and butter are emulsions.

**53. Question**

One of the following does not show Tyndall effect. This one is :

A. soap solution

B. ink

C. sugar solution

D. starch solution

**Answer**

Sugar solution does not show tyndall effect as it is a true solution.

**54. Question**

Which one of the following is most likely to exhibit Tyndall effect?

A. sugar and water mixture

B. potash alum and water mixture

C. chalk powder and water mixture

D. potassium permanganate and water mixture

**Answer**

Chalk powder and water mixture is a colloidal solution which exhibits tyndall effect.

**55. Question**

Milk of Magnesia is:

A. a colloid

B. a true solution

C. a homogeneous mixture

D a suspension

**Answer**

Milk of magnesia is a suspension as it is a heterogeneous mixture.

**56. Question**

Which of the following represents the solubility of sugar in water at 20°C?

A. 21 g

B. 204 g

C. 37 g

D. 164 g

**Answer**

(b)

**57. Question**

Which one of the following is not a chemical change?

A. formation of curd

B. ripening of banana

C. sublimation of naphthalene

D. corrosion of photo frame

**Answer**

sublimation of naphthalene is not a chemical change as it is reversible.

**58. Question**

One of the following liquids will leave behind a residue on heating. This one is:

A. brine

B. bromine

C. mercury

D. alcohol

**Answer**

(a)

**59. Question**

Which of the following can be called a suspension?

A. milk

B. milk of magnesia

C. salt solution

D. vinegar

**Answer**

Milk of magnesia is called suspension as it is a heterogeneous mixture.

**60. Question**

One of the following represents the solution of solid in a solid. This one is:

A. boron

B. brass

C. beryllium

D. bread

**Answer**

Solution of two or more solids are generally known as solid-solid solution. For example – alloys. Alloy is a homogeneous mixture of two or more metals and non metals or two metals or two non-metals.

**61. Question**

The rusting of an iron object is called:

A. corrosion and it is a physical as well as a chemical change

B. dissolution and it is a physical change

C. corrosion and it is a chemical change

D. dissolution and it is a chemical change

**Answer**

(c)

**62. Question**

A mixture of sulphur and carbon disulphide is:

A. heterogeneous and shows Tyndall effect

B. homogeneous and shows Tyndall effect

C. heterogeneous and does not show Tyndall effect

D. homogeneous and does not show Tyndall effect

**Answer**

A mixture of sulphur and carbon disulphide is homogeneous solution and does not show Tyndall effect.

**63. Question**

Tincture of iodine has antiseptic properties. This solution is made by dissolving:

A. iodine in potassium iodide

B. iodine in acetone

C. iodine in water

D. iodine in alcohol

**Answer**

(d)

**64. Question**

Which of the following are physical changes?

(i) melting of iron metal

(ii) rusting of iron metal

(iii) bending of an iron rod

(iv) drawing wire of iron metal

A. (i), (ii) and (iii)

B. (i), (ii) and (iv)

C. (i), (iii) and (iv)

D. (ii), (iii) and (iv)

**Answer**

(c)

**65. Question**

Which of the following are chemical changes?

(i) decaying of wood

(ii) burning of wood

(iii) sawing of wood

(iv) hammering of nail into wood

A. (i) and (ii)

B. (ii) and (iii)

C. (iii) and (iv)

D. (i) and (iv)

**Answer**

(a)

**Questions Based on High Order Thinking Skills (HOTS)-Pg-82**

**66. Question**

Many indigestion mixtures are suspensions. What do the instructions written on the bottle of an indigestion mixture tell us before taking the mixture, and why?

**Answer**

“Shake well before use”. This is because the particles of indigestion mixture settle down at the bottom of the bottle.

**67. Question**

Three mixtures A, B and C are obtained by stirring three different solids in water taken in separate beakers. When mixture A is allowed to stand for some time, then its particles settle at the bottom of the beaker. When a beam of light is passed through mixture A in a dark room, the path of light becomes visible

when observed from the side of the beaker. When mixture B is allowed to stand for a considerable time, even then its particles do not settle down. Mixture B, however, scatters the beam of light just like mixture A. The particles of mixture C do not settle down on keeping and it also does not scatter a beam of light passing through it.

(a) What are the mixtures like A known as?

(b) What are the mixtures like B known as?

(c) What are the mixtures like C known as?

(d) Name the phenomenon exhibited by A and B which occurs on passing a beam of light through them.

(e) Name one mixture each which is like (i) A (ii) B, and (iii) C.

**Answer**

(a) Suspensions

(b) Colloids

(c) True solutions

(d) As A and B are suspensions and colloids, they will show Tyndall effect

(e) (i) Example of suspension is Chalk-water mixture

(ii) Example of colloid is Soap solution

(iii) Example of true solution is Salt solution

**68. Question**

When the solid A is added to water, it dissolves with the evolution of a lot of heat and making little explosions to form two products B and C. The properties of products B and C are entirely different from those of solid A as well as water. Moreover, products B and C cannot be reconverted into solid A and water. When another solid D is added to water, it dissolves with the absorption of a little heat to form a product E which cools down. The product E shows the properties of both, solid D as well as water. Moreover, product E can be converted into solid D and water.

(a) What type of change occurs when solid A is dissolved in water? Why?

(b) What type of change occurs when sold D is dissolved in water? Why?

(c) Name a metal which you think could behave like solid A. Also name the products B and C.

(d) Name the solid D if it is the one which is used in making ordinary dry cells.

(e) Name the process by which D can be recovered from E.

**Answer**

(a) Chemical change; Because the properties of products B and C are entirely different from those of solid A and water

(b) Physical change; Because the product E shows the properties of both, solid D and water

(c) Sodium; Sodium hydroxide and Hydrogen

(d) Ammonium chloride

(e) Evaporation

**69. Question**

100 ml of water at room temperature of 25°C is taken in a beaker and a little of solid S is dissolved in it by stirring to obtain a solution X. More and more of solid S is added to the solution with constant stirring, while keeping the temperature of solution constant at 30°C. After some time it is observed that no more solid dissolves in water and at the same time some solid is also left undissolved at the bottom of the beaker. The contents of beaker are filtered through a filter paper to obtain solution Y in the form of a filtrate.

(a) What name is given to solutions like X?

(b) What name is given to solution like Y?

(c) What will you observe if the solution Y at 30°C is cooled down to 10°C by keeping the beaker in crushed ice? Why?

(d) What term is used to denote the amount of solid dissolved in 100 grams of water in a solution like Y?

**Answer**

(a) Unsaturated solution

(b) Saturated solution

(c) Some of the dissolved solid will separate from the solution and settle down a the bottom of the beaker; Because the solubility of solid decreases on cooling

(d) Solubility

**70. Question**

The solubility of ammonium chloride in water at various temperatures is given below:

Temperature: 10°C 20°C 40°C 60°C 80°C

Solubility: 24 g 37 g 41 g 55 g 66 g

**Answer**

Solubility at 40C = 41g

Solubility = Solid dissolved in 100g of water in a solution

So, mass of ammonium chloride needed to make a saturated solution of ammonium chloride in 50 g of water = 41/2 = 20.5g

**Very Short Answer Type Questions-Pg-105**

**1. Question**

Name the solvent you would use to separate a mixture of sulphur and carbon.

**Answer**

A mixture of sulphur and carbon can be separated by the solvent extraction method. Carbon disulphide or carbon tetrachloride is used as a solvent. The sulphur component gets dissolved in solvent and undissolved carbon is separated by filtration. The dissolved sulphur can be evaporated from the solution.

**2. Question**

Name the process you would use to separate ammonium chloride from a mixture of sodium chloride and ammonium chloride.

**Answer**

A mixture of sodium chloride and ammonium chloride can be separated out using the process of sublimation. For this, the mixture is heated in a China dish.

**3. Question**

Which method can be used to separate a mixture of naphthalene and common salt?

**Answer**

We can separate the sublimating substance (Naphthalene / Anthracene / Camphor / Ammonium chloride) from the mixture of naphthalene and common salt

through the process of sublimation.

**4. Question**

Name the process you would use to separate a mixture of anthracene and copper sulphate?

**Answer**

We can separate the sublimating substance (Naphthalene / Anthracene / Camphor / Ammonium chloride) from the mixture of anthracene and copper sulphate

through the process of sublimation.

**5. Question**

Name the property of any one of the components which can be used for separation the following mixture:

Salt and Camphor

**Answer**

We can separate the sublimating substance (Naphthalene / Anthracene / Camphor / Ammonium chloride) from the mixture of salt and camphor through the process of sublimation.

**6. Question**

What type of magnet is fitted on a crane to separate scarp iron objects from a heap of waste materials in factories?

**Answer**

When a crane fitted with a powerful electromagnet is lowered on to the heap of waste materials, then the scrap iron objects get separated. The crane is then moved up and away to drop these scrap iron objects at a separate place.

**7. Question**

Name the property of one of the constituents which can be used to separate a mixture of salt and iodine.

**Answer**

We can separate the sublimating substance (Naphthalene / Anthracene / Camphor / Ammonium chloride/ Iodine) from the mixture of iodine and salt through the process of sublimation.

**8. Question**

Name the process you would use to separate a mixture of two miscible liquids (like acetone and water).

**Answer**

Fractional distillation is the process to separate a mixture of two miscible liquids (like acetone and water).

**9. Question**

What difference in the property of two miscible liquids enables their separation by fractional distillation?

**Answer**

Difference in boiling points enables separation of two miscible liquids by fractional distillation.

**10. Question**

Name one pair of substances whose mixture can be separated by fractional distillation.

**Answer**

Alcohol and water can be separated by fractional distillation.

**11. Question**

Name one pair of liquids which can be separated by using a separating funnel.

**Answer**

Oil and water can be separated by using a separating funnel.

**12. Question**

State whether the following statements are true or false:

(a) Alcohol can be separated from a mixture of alcohol and water by a separating funnel.

(b) Salt and water can be recovered from an aqueous salt solution by the process of evaporation.

**Answer**

(a) False

(b) False

**13. Question**

Name the source from which nitrogen and oxygen are obtained on a large scale.

**Answer**

Air is the source from which nitrogen and oxygen are obtained on a large scale as air contains large quantities of both of these gases.

**14. Question**

Name the process by which the various gases of the air are separated.

**Answer**

Air comprises of nitrogen, oxygen, carbon dioxide and argon as major components. Since air is the cheapest source of these gases, thus these are extracted from air at large scale. After liquefaction of air by repeated compression and cooling; nitrogen, oxygen, carbon dioxide and argon are extracted using fractional distillation.

**15. Question**

A carpenter wants to separate iron nails from saw-dust. Which method of separation should he choose?

**Answer**

If a mixture contains iron as one of the constituent, it can be separated by using magnet. A mixture of iron filing and saw dust can be separated by using magnet. This is because iron filling are attracted by a magnet but saw dust is not attracted by a magnet.

**16. Question**

Name any two solid substances whose mixture can be separated by sublimation.

**Answer**

Ammonium chloride and sodium chloride are two solid substances whose mixture can be separated by sublimation.

**17. Question**

Name one pair of substances whose mixture can be separated completely by distillation

**Answer**

Salt and water is one pair of substances whose mixture can be separated completely by distillation

**18. Question**

How will you separate a mixture of chalk powder and water?

**Answer**

The mixture containing chalk powder and water is allowed to get filtered.

(Filter paper can be used for filtration). After filtration, the retentive obtained is chalk and the filtrate obtained is water without chalk.

The retentive is allowed to get dried and thence, chalk is obtained in powder form. In this manner, we can separate chalk powder from water.

**19. Question**

Name the process which can be used to separate a mixture of salt solution and sand.

**Answer**

Salt is soluble in water whereas sand is insoluble in water. This difference in solubility of salt and sand in water is used to separate them. The mixture of salt and sand is taken in a beaker and water is added to it. The mixture is stirred to dissolve the salt in water. The sand remains undissolved. The salt solution containing sand is filtered by pouring over a filter paper kept in a funnel. Sand remains as a residue on the filter paper and salt solution is obtained as a filtrate in a beaker kept below the funnel.

**20. Question**

Name the process which can be used to recover salt from and aqueous salt solution.

**Answer**

The solution of common salt and water is taken in a china dish and heated gently by using a burner. The water present in salt solution will form water vapours and escape into atmosphere. When all the water present in the solution of common salt and water gets evaporated, then common salt is left behind in the china dish as a white solid. The process of evaporation is used on a large scale to obtain common salt from sea water.

**21. Question**

Name the process which is used in milk dairies to separate cream from milk.

**Answer**

The process of centrifugation is used in dairies to separate cream from milk. The milk is put in a closed container in big centrifuge machine. When the centrifuge machine is switched on, the milk is rotated at a very high speed in its container. Due to this, the milk separates into cream and skimmed milk.

**22. Question**

State one application of centrifugation.

**Answer**

The process of centrifugation is also used in washing machines to squeeze out water from wet clothes and make them dry.

**23. Question**

What is the general name of the process by which tea-leaves are separated from prepared tea?

**Answer**

A heterogeneous mixture of a solid (tea leaves) and a liquid(tea) can be separated by the process of filtration. Pour the tea through a strainer. The tea leaves will get strained and clear solution of tea is obtained.

**24. Question**

Name the process you would use to separate a mixture of water and alcohol.

**Answer**

The mixture of alcohol and water can be separated by the process of distillation. The mixture of water and alcohol is taken in a flask and is heated. Since the boiling point of water is less than that of alcohol, water vaporizes fast and it gets condensed in the condenser and is collected. After that alcohol gets condensed and the mixture is separated.

**25. Question**

Name the process you would use to separate oil from water.

**Answer**

Those liquids which do not mix with each other and form separate layer are called immiscible liquids. For Ex: Oil and water, Petrol and water etc. A mixture of immiscible liquids is separated by using an apparatus called separating funnel.

**26. Question**

What differences in the properties of oil and water enable their separation by a separating funnel?

**Answer**

Those liquids which do not mix with each other and form separate layer are called immiscible liquids. For Ex: Oil and water, Petrol and water etc. A mixture of immiscible liquids is separated by using an apparatus called separating funnel.

**27 A. Question**

Name the process by which common salt is obtained from sea-water

**Answer**

Evaporation is the process by which common salt is obtained from sea-water

**27 B. Question**

Name the process by which common salt is purified.

**Answer**

We can use centrifuging method to separate the mixture of pure salt and rock salt. The rock salt are heavier than pure salt so during centrifuging process, the pure salt settles above whereas the rock salt settles down at the test tube.

**28. Question**

Name the process which can be used to purify an impure sample of copper sulphate.

**Answer**

The crystallisation method is used to purify solids. For example, to purify an impure sample of copper sulphate. To remove these impurities, the process of crystallisation is used. Crystallisation is a process that separates a pure solid in the form of its crystals from a solution.

**29 A. Question**

Name the process by which all the dye can be recovered from black ink.

**Answer**

Evaporation

**29 B. Question**

Name the process by which the various ‘dyes’ (coloured materials) present in black ink can be separated.

**Answer**

Chromatography

**30. Question**

Which technique is used in a washing machine to squeeze out water from wet clothes while drying?

**Answer**

Centrifugation is used in a washing machine to squeeze out water from wet clothes while drying.

**31. Question**

Which technique can be used to detect and identify traces of poison present in the stomach wash of a person?

**Answer**

Chromatography is used in forensic sciences to detect and identify trace amount of substances in the contents of bladder and stomach.

**32. Question**

Fill in the following blanks with suitable words:

(a) Miscible liquids are separated by ……..... .

(b) Immiscibl liquids are separated by using a ……..... .

(c) A mixture of kerosene and petrol can be separated by …….. .

(d) The separation of liquids by fractional distillation is based o the difference in their ……..... .

(e) The gases of air can be separated by fractional distillation of liquid air because they have different …….. .

(f) A heterogeneous mixture of liquid and solid is conveniently separated by …….. .

(g) If a mixture contains iron filings as one of the constituents, if can be separated by using a ……..... .

**Answer**

(a) fractional distillation

(b) separating funnel

(c) fractional distillation

(d) boiling points

(e) boiling points

(f) centrifugation

(g) magnet

**Short Answer Type Questions-Pg-106**

**33. Question**

How will you separate a mixture containing sand and sugar?

**Answer**

The mixture of sugar and sand is taken in a beaker and water is added to it. The mixture is stirred to dissolve the sugar in water. The sand remains undissolved. The sugar solution containing sand is filtered by pouring over a filter paper kept in a funnel. Sand remains as a residue on the filter paper and sugar solution is obtained as a filtrate in a beaker kept below the funnel.

**34. Question**

What difference in the properties of common salt and sand would enable you to separate a mixture of these two substances?

**Answer**

Salt is soluble in water whereas sand is insoluble in water. This difference in solubilities of salt and sand in water is used to separate them.

**35. Question**

Describe a method of separate a mixture of common salt and sand.

**Answer**

The mixture of salt and sand is taken in a beaker and water is added to it. The mixture is stirred to dissolve the salt in water. The sand remains undissolved. The salt solution containing sand is filtered by pouring over a filter paper kept in a funnel. Sand remains as a residue on the filter paper and salt solution is obtained as a filtrate in a beaker kept below the funnel.

**36. Question**

How would you separate a mixture of sugar and salt?

**Answer**

Sugar is soluble in alcohols while salt is not. Simply mix the two in alcohol and filter the solution to get the salt. Then evaporate the alcohol sugar mixture and you will be left with the sugar.

**37. Question**

How will you separate a mixture of sodium chloride and sand?

**Answer**

The mixture of salt(sodium chloride) and sand is taken in a beaker and water is added to it. The mixture is stirred to dissolve the salt in water. The sand remains undissolved. The salt solution containing sand is filtered by pouring over a filter paper kept in a funnel. Sand remains as a residue on the filter paper and salt solution is obtained as a filtrate in a beaker kept below the funnel.

**38. Question**

Write a method to separate a mixture of sand and potash alum.

**Answer**

To separate the mixture of sand and potash alum . First mix it with water , then filteration. Alum can separated from water by crystallisation.

**39. Question**

How would you obtain sodium chloride from a mixture of sodium chloride and sulphur without using water?

**Answer**

Carbon disulphide is a suitable solvent for sulphur. Sodium chloride remains undissolved and can be separated by filtration process.

**40. Question**

How would you separate iodine from a mixture of iodine and common salt?

**Answer**

It is separated by the process of sublimation. When the mixture of iodine and salt is heated, then iodine sublimates and salt is left.

**41. Question**

Describe a method to separate a mixture of camphor and sand.

**Answer**

We can separate the sublimating substance (Naphthalene / Anthracene / Camphor / Ammonium chloride/ Iodine) from the mixture of camphor and sand through the process of sublimation.

**42. Question**

How will you separate a mixture of iron filings and powdered carbon?

**Answer**

Spread the mixture of iron fillings and powdered carbon on a flat surface. Wrap the magnet in the paper towel. Use the magnet to remove the iron by pulling it across the surface of the mixture. The filings stick to the magnet while the sand and salt are left behind. Remove the paper towel from the magnet to collect the filings.

**43. Question**

How will you separate a mixture of iron filings and sulphur powder without using carbon disulphide?

**Answer**

Spread the mixture of iron fillings and powdered carbon on a flat surface. Wrap the magnet in the paper towel. Use the magnet to remove the iron by pulling it across the surface of the mixture. The filings stick to the magnet while the sand and salt are left behind. Remove the paper towel from the magnet to collect the filings.

**44. Question**

How is scrap iron separated from a heap of waste materials in factories?

**Answer**

When a crane fitted with a powerful electromagnet is lowered on to the heap of waste materials, then the scrap iron objects get separated. The crane is then moved up and away to drop these scrap iron objects at a separate place.

**45. Question**

How is the impurity of iron present in several substances removed in industries?

**Answer**

If a mixture contains iron as one of the constituent, it can be separated by using horse shoe magnet. A mixture of iron and other impurities can be separated by using horse shoe magnet. This is because iron impurities are attracted by a magnet.

**46. Question**

How will you separate iron pins from sand?

**Answer**

If a mixture contains iron as one of the constituent, it can be separated by using magnet. A mixture of iron pins and sand can be separated by using magnet. This is because iron pins are attracted by a magnet but sand is not attracted by a magnet.

**47. Question**

How will you separate a mixture of common salt, sulphur powder and sand?

**Answer**

Add water to the mixture of sand, salt and sulphur and stir. Salt will dissolve in water. Filter this solution and evaporate the filtrate to get salt. Add carbon disulphide to the residue containing a mixture of sulphur and sand. Sulphur will dissolve in carbon disulphide. Filter this solution.

**48. Question**

A mixture contains water, kerosene and sand. How will you separate this mixture?

**Answer**

The mixture containing sand is filtered by pouring over a filter paper kept in a funnel. Sand remains as a residue on the filter paper and mixture of water and kerosene is obtained as a filtrate in a beaker kept below the funnel.

When the mixture of water and kerosene is put in a separating funnel, it forms two layers. Water being heavier, forms the lower layer in the separating funnel whereas kerosene being lighter forms the upper layer. On opening the stop cock of separating funnel, the lower layer of water comes out first and collected in a beaker. When water layer has completely run off, then stop cock is closed. the kerosene is left behind in the separating funnel. It can be removed in a separate beaker by opening the stop cock again.

**49. Question**

Describe the method of separating a mixture containing common salt, sand and ammonium chloride.

**Answer**

Sublimation is the process of transition of a substance from the solid to the gaseous state without passing through the liquid state. To separate mixtures that contain a sublimate with volatile component from a non-sublimate impurity, the sublimation process is used. Ammonium chloride changes directly from solid to gaseous state on heating. The gaseous form of ammonium chloride can be cooled easily to get a pure solid. Other examples of solids which sublime are camphor, naphthalene, anthracene, iodine, etc. The remaining components of the mixture are salt and sand. Salt is soluble in water and sand is a non-water soluble substance that can be separated by the process of filtration. The insoluble sand remains in the filter paper while the filtrate contains the dissolved salt. Evaporation technique is used to separate salt from the filtrate. Common salt does not decompose during evaporation. As the water evaporates, fewer and fewer water molecules are present to keep the salt particles apart. The salt therefore recrystallizes and can be collected.

**50. Question**

How will you separate camphor, common salt and iron nails from their mixture?

**Answer**

Spread the camphor, salt and iron mixture on a flat surface. Wrap the magnet in the paper towel. Use the magnet to remove the iron by pulling it across the surface of the mixture. The filings stick to the magnet while the sand and salt

are left behind. Remove the paper towel from the magnet to collect the filings. Mixture of camphor and common salt are heated. As camphor will sublime, leaving behind salt.

**51. Question**

You are given a mixture of water, groundnut oil and common salt. How will you separate groundnut oil and common salt from it?

**Answer**

When the mixture of water, salt and groundnut oil is put in a separating funnel, it forms two layers. Water with salt being heavier, forms the lower layer in the separating funnel whereas oil being lighter forms the upper layer. On opening the stop cock of separating funnel, the lower layer of water comes out first and collected in a beaker. When water layer has completely run off, then stop cock is closed. the oil is left behind in the separating funnel. It can be removed in a separate beaker by opening the stop cock again.

The solution of common salt and water is taken in a china dish and heated gently by using a burner. The water present in salt solution will form water vapours and escape into atmosphere. When all the water present in the solution of common salt and water gets evaporated, then common salt is left behind in the china dish as a white solid.

**52. Question**

Discuss the method of separating a mixture containing chalk powder, iron fillings and naphthalene.

**Answer**

Use the magnet to remove the iron- Spread the chalk powder, naphthalene and iron mixture on a flat surface. Wrap the magnet in the paper towel. Use the magnet to remove the iron by pulling it across the surface of the mixture. The filings stick to the magnet while the chalk and salt are left behind. Remove the paper towel from the magnet to collect the filings.

The mixture of chalk and naphthalene is separated by the process of sublimation. When the mixture of chalk and naphthalene is heated, then naphthalene sublimates and chalk is left.

**53. Question**

Describe the various steps involved in the separation of iodine, iron filings and salt from a mixture.

**Answer**

Use the magnet to remove the iron- Spread the iodine, salt and iron mixture on a flat surface. Wrap the magnet in the paper towel. Use the magnet to remove

the iron by pulling it across the surface of the mixture. The filings stick to the magnet while the chalk and salt are left behind. Remove the paper towel from the magnet to collect the filings.

The mixture of iodine and salt is separated by the process of sublimation. When the mixture of iodine and salt is heated, then iodine sublimates and salt is left.

**54. Question**

How will you separate a mixture of iron filings, chalk powder an common salt?

**Answer**

Use the magnet to remove the iron- Spread the chalk powder, salt and iron mixture on a flat surface. Wrap the magnet in the paper towel. Use the magnet to remove the iron by pulling it across the surface of the mixture. The filings stick to the magnet while the chalk and salt are left behind. Remove the paper towel from the magnet to collect the filings.

To separate the chalk powder and salt-

(a) First, add water to the salt and chalk solution.

(b) Stir until the salt dissolves.

(c) The chalk will form a layer on top of the water, allowing you to scoop it out with a spoon.

(d) Then, let the water evaporate on a hot plate, which will cause the salt to be collected in the container.

**55. Question**

How will you separate common salt, sand and iron filings from their mixture?

**Answer**

Use the magnet to remove the iron- Spread the sand, salt and iron mixture on a flat surface. Wrap the magnet in the paper towel. Use the magnet to remove the iron by pulling it across the surface of the mixture. The filings stick to the magnet while the sand and salt are left behind. Remove the paper towel from the magnet to collect the filings.

Use warm water to dissolve the salt- Put the remaining salt and sand mixture into the glass of warm water, and stir until all the salt has dissolved. The sand remains undissolved and hence can be collected from bottom of the jar. The salt solution can undergo process of evaporation for the separation of salt.

**56. Question**

How will you separate a mixture of kerosene oil and water? Explain with the help of a labeled diagram.

**Answer**

Those liquids which do not mix with each other and form separate layer are called immiscible liquids. For Ex: Oil and water, Petrol and water etc. A mixture of immiscible liquids is separated by using an apparatus called separating funnel.

**57. Question**

How will you separate water from mustard oil?

**Answer**

A mixture of two immiscible liquids (such as water and oil) can be separated by using a separating funnel.

When the mixture of water and mustard oil is put in a separating funnel, it forms two layers. Water being heavier, forms the lower layer in the separating funnel whereas oil being lighter forms the upper layer. On opening the stop cock of separating funnel, the lower layer of water comes out first and collected in a beaker. When water layer has completely run off, then stop cock is closed. the oil is left behind in the separating funnel. It can be removed in a separate beaker by opening the stop cock again.

**58. Question**

How will you separate a mixture of cooking oil (groundnut oil) and water?

**Answer**

A mixture of two immiscible liquids(such as water and oil) can be separated by using a separating funnel.

When the mixture of water and cooking oil is put in a separating funnel, it forms two layers. Water being heavier, forms the lower layer in the separating funnel whereas oil being lighter forms the upper layer. On opening the stop cock of separating funnel, the lower layer of water comes out first and collected in a beaker. When water layer has completely run off, then stop cock is closed. the oil is left behind in the separating funnel. It can be removed in a separate beaker by opening the stop cock again.

**59. Question**

How will you separate a mixture of mercury, oil and water?

**Answer**

The separation of three immiscible liquids(mercury, oil and water) by a separating funnel depends on the differences in their densities. The mixture of

three immiscible liquids is put in a separating funnel and allowed to stand for sometime. the mixture separates into three layers according to the densities of the liquid in it. The heavier or denser liquid forms the lower layer whereas the lighter liquids forms the middle and upper layers. On opening the stop cock of separating funnel, the lower layer of Mercury(heavier liquid) comes out first and collected in a beaker. When the lower layer of heavier liquid is completely run off, the stop cock is closed. The water in the medium layer is collected in a separate beaker by opening the stop cock again. Finally oil with lighter density than water and mercury will remain in funnel and can be connected in a separate jar.

**60. Question**

Describe a method for separating a mixture of iron filings and sulphur powder other than that by using a magnet.

**Answer**

A mixture of iron filing and sulphur powder can be separated by using magnet. This is because iron filling are attracted by a magnet but sulphur is not attracted by a magnet. In order to separate iron filing from sulphur powder, a horse-shoe magnet is moved over the surface of the mixture. The iron filings are attracted by the magnet, they cling to the poles of the magnet and get separated.

**61. Question**

How is cream separated form milk?

**Answer**

Answer- The process of centrifugation is used in dairies to separate cream from milk. The milk is put in a closed container in big centrifuge machine. When the centrifuge machine is switched on, the milk is rotated at a very high speed in its container. Due to this, the milk separates into cream and skimmed milk.

**62. Question**

Explain how, impure copper sulphate can be purified by crystallization.

**Answer**

Procedure of purification of impure copper sulphate by crystallization-

1) Impure copper sulphate is dissolved in minimum amount of water.

2) The solution is filtered to remove insoluble impurities.

3) The clear solution is heated gently on a water bath till a concentrated solution or saturated solution is obtained.

4) Allow the hot ,saturated solution to cool slowly.

5) Crystals of pure copper sulphate are formed. Impurities remain dissolved in solution.

6) Separate the crystals of pure Copper sulphate by filtration and dry them.

**63. Question**

Which method is better for recovering sugar from sugar solution: evaporation or crystallization? Give reason for your answer.

**Answer**

The process of evaporation gives residue which may contain impurities. When there is requirement to obtain solid without impurity, crystallization method is preferred.

In general practice, impure solids are obtained by evaporation and are further purified by crystallization. Sugar crystal cannot be obtained by simple evaporation technique because sugar gets charred on heating to dryness. In such cases, crystallization technique is applied.

**64. Question**

What is chromatography? State its two applications.

**Answer**

Chromatography is a method used to separate the different components in a liquid mixture. This method is based on the different properties of compounds in two phases: stationary and mobile phase.

Applications of chromatography

1) It is used to separate solution of coloured substances.

2) It is used in forensic sciences to detect and identify trace amount of substances in the contents of bladder and stomach.

3) It is used to separate small amount of products of chemical reaction.

**65. Question**

Which of the following can be separated by using a separating funnel and which cannot be separated by using a separating funnel?

(a) water and kerosene mixture

(b) water and acetone mixture

Give reasons for your answer.

**Answer**

A separating funnel is used for the separation of components of a mixture between two immiscible liquid phases. One phase is the aqueous phase and the other phase is an organic solvent. This separation is based on the differences in the densities of the liquids. The liquid having more density forms the lower layer and the liquid having less density forms the upper layer. Hence water and kerosene mixture can be separated by using a separating funnel whereas water and acetone are separated by the process of distillation.

**Long Answer Type Questions-Pg-107**

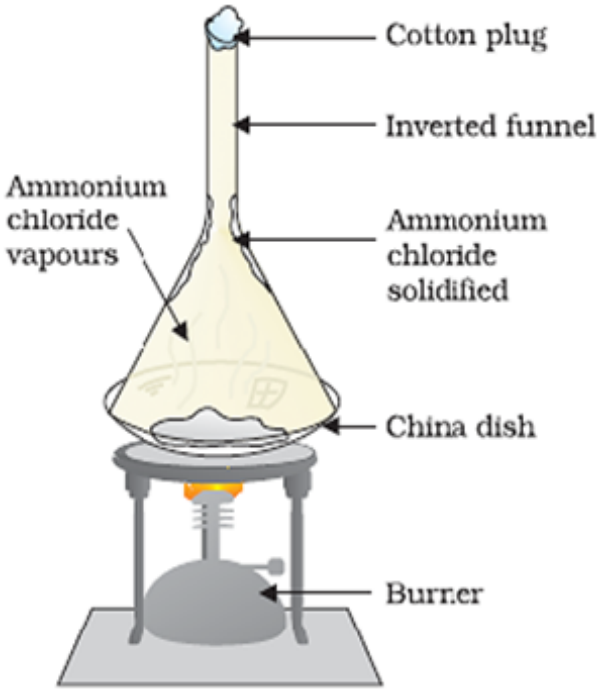
**66. Question**

With the help of a labelled diagram, describe the method of separating ammonium chloride from a mixture of ammonium chloride and common salt. Mention the difference in the properties of ammonium chloride and sodium chloride which has made this separations possible.

**Answer**

There are many substances which are converted into gas from solid when heated, and converted from gas to solid when cooled without converting into liquid. Such substances are known as sublime. For example – ammonium chloride, naphthalene balls, camphor, etc. Therefore, mixture of one sublime and other substance can be separated using the method of sublimation.

The mixture of ammonium chloride and common salt can be separated out using the process of sublimation. For this, the mixture is heated in a China dish. The China dish is covered by an inverted funnel. Cotton is used for plugging the opening of the funnel. After heating, ammonium chloride is converted into vapour and gets deposited over the inner surface of funnel; due to cooling. This leaves the common salt in China dish. Ammonium chloride can be taken out by scratching from the inner wall of funnel.




The process of sublimation is used to separate that component of a solid-solid mixture which sublimes on heating. Hence the property of ammonium chloride to sublime has made this separations possible.

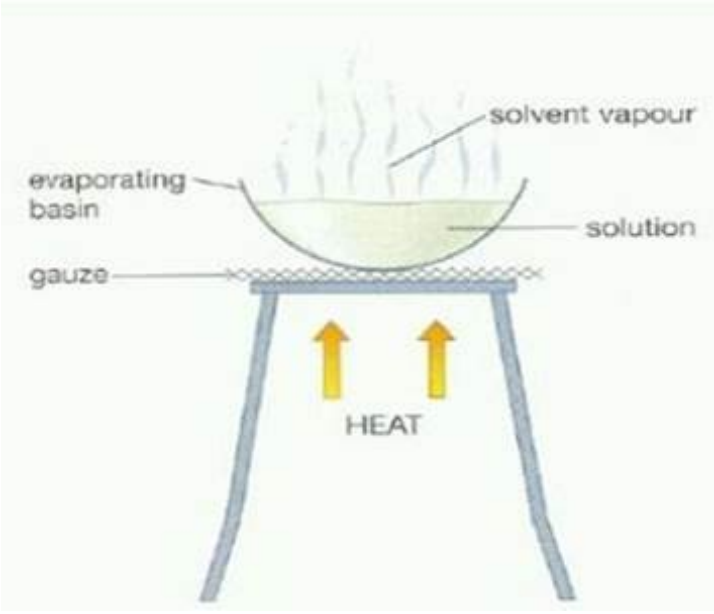
**67. Question**

How can you obtain pure water from a salt-water mixture (or salt-solution)? Draw a meat and labelled diagram of the apparatus you would use to obtain pure water from a salt-water mixture (or salt-solution).

**Answer**

The solution of common salt and water is taken in a china dish and heated gently by using a burner. The water present in salt solution will form water vapours and escape into atmosphere. When all the water present in the solution of common salt and water gets evaporated, then common salt is left behind in the china dish as a white solid.

The process of evaporation is used on a large scale to obtain common salt from sea water. Evaporation is used for recovering dissolved solid substances from liquid mixtures but the liquid itself cannot be recovered by this method.




**68. Question**

How is water purified on a large scale at water works? Explain with the help of a labelled diagram. Name the substance which is added to kill germs in the drinking water supply?

**Answer**

Process of water purification on a large scale at water works-

**1). Sedimentation:**

Water pumped from the source (river, lake or dam) is allowed to stand in large tanks, called settling tanks, for a few hours. Mud, sand and other suspended particles settle down. The addition of a small quantity of potash alum helps the suspended particles to settle down quickly. The solid that settles at the bottom of the tank is called sediment. That is why these tanks are also called sedimentation tanks. The water over the sediment layer is more or less clean.

**2). Filtration:**

The water from the sedimentation tank is filtered through layers of sand and gravel. Filtration is also done through activated charcoal, which affords better-quality water. Activated charcoal is a special type of charcoal made by heating ordinary charcoal in vacuum. This charcoal holds the impurities strongly.

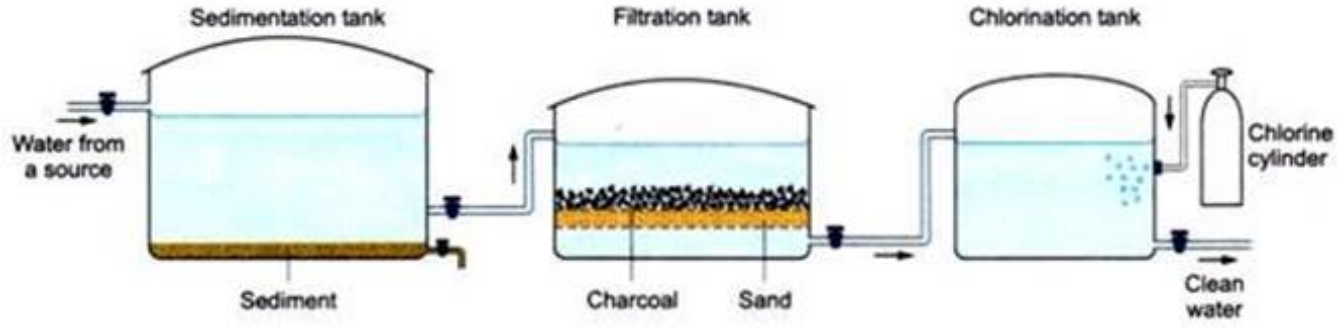



Fig. 16.12 Operations at waterworks

**3). Chlorination:**

The filtered water is then treated with chlorine gas, which kills germs.

Process of adding chlorine (Cl) or hypochlorite to water ensures the killing of germs. This method is used to kill certain bacteria and other microbes in tap water as chlorine is highly toxic. In particular, chlorination is used to prevent the spread of waterborne diseases such as cholera, dysentery, typhoid etc.

**69 A. Question**

What is fractional distillation? What is the use of fractionating column in fractional distillation?

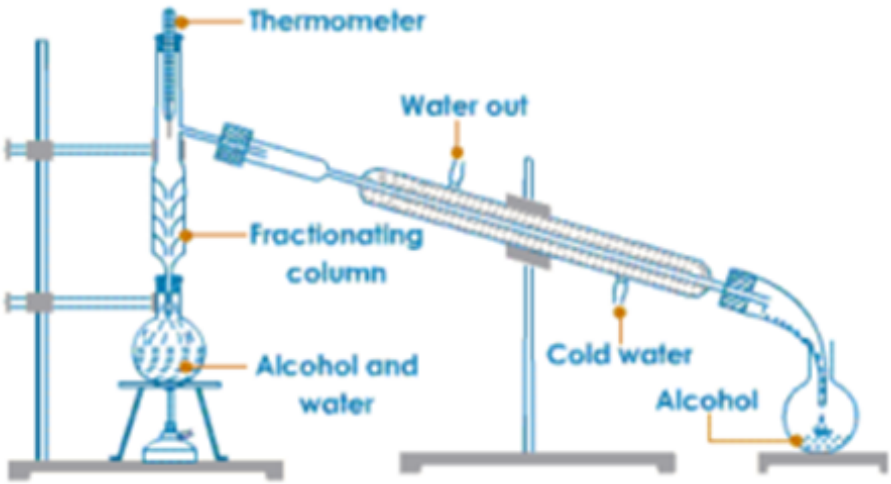
**Answer**

Fractional distillation is the process of separating two or more miscible liquids by distillation. The distillate being collected in fractions boiling at different temperatures. The separation of two liquids by fractional distillation depends on the differences in their boiling points. A simple Fractionating column is a long vertical glass tube filled with glass beads. It can be regarded as an arrangement for providing different temperature zones inside it, the highest temperature being at the bottom of the column and lowest temperature near its top. The Fractionating column is fitted in the neck of the distillation flask containing the mixture of liquids to be separated.

**69 B. Question**

Draw a labelled diagram of the fractional distillation apparatus used for separating a mixture of alcohol and water.

**Answer**




The boiling point of alcohol is 78°C and boiling point of water is 100°C therefore a mixture of alcohol and water can be separated by fractional distillation. The alcohol with boiling point 78°C will distil first and then water with boiling point 100°C will distil later. Fractional distillation separates the various liquids according to their boiling point, the more volatile liquid

(having lower boiling point) distils first and the less volatile liquid (having higher boiling point) distils later.

**70 A. Question**

Explain how, nitrogen, oxygen and argon gases are separated form air.

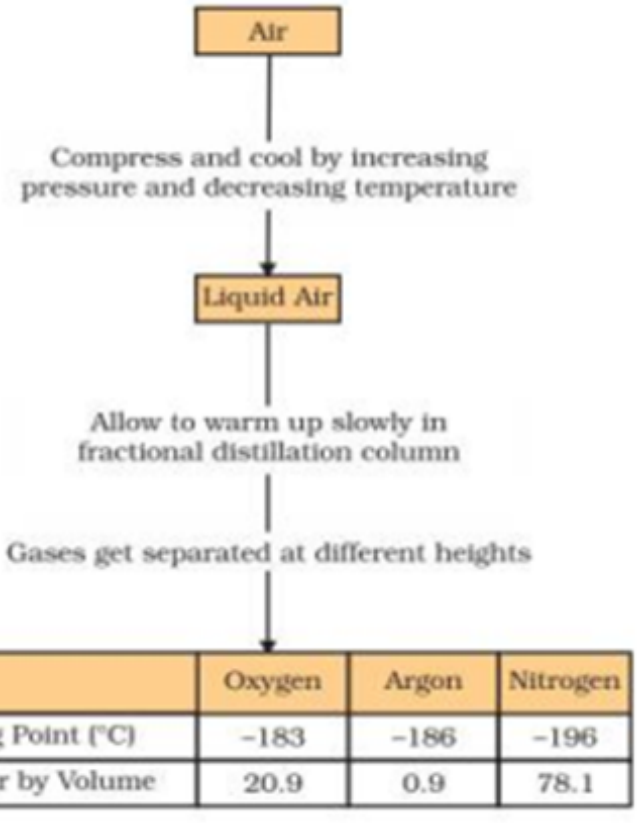
**Answer**

Air comprises of nitrogen, oxygen, carbon dioxide and argon as major components. Since air is the cheapest source of these gases, thus these are extracted from air at large scale. After liquefaction of air by repeated compression and cooling; nitrogen, oxygen, carbon dioxide and argon are extracted using fractional distillation. Liquid nitrogen has boiling point equal to - $196^0$C and thus turns into gas first and separated from air. The boiling point of argon is - $186^0$C, therefore it is extracted after argon. The boiling point of oxygen is - $183^0$C, thus it is collected after the extraction of argon. Carbon dioxide turns into solid at a temperature of - $97^0$C, therefore, it is removed while air is put under liquefaction.

**70 B. Question**

Draw a flow diagram of the processes involved in obtaining gases like nitrogen, oxygen and argon from air.

**Answer**




| | Oxygen | Argon | Nitrogen |
|---|---|---|---|
| Boiling Point (°C) | −183 | −186 | −196 |
| % Air by Volume | 20.9 | 0.9 | 78.1 |

**Multiple Choice Questions (MCQs)-Pg-107**

**71. Question**

A mixture of milk and ground oil can be separated by:

A. sublimation

B. evaporation

C. separating funnel

D. filtration

**Answer**

A mixture of two immiscible liquids can be separated by using a separating funnel such as oil and water.

**72. Question**

Which of the following mixture cannot be separated by using water as the solvent?

A. copper sulphate and sand

B. sand and potash alum

C. sand and sulphur

D. sugar and sand

**Answer**

Both sugar and sulphur are insoluble in water,so water can not be used as a solvent to separate them. However sulphur is soluble in carbon disulpide whereas sand is insoluble in carbon disulpide.

**73. Question**

The chemical which can be used to separate a mixture of carbon powder and sulphur powder successfully is:

A. carbon dioxide

B. hydrochloric acid

C. hydrogen sulphide

D. carbon disulphide

**Answer**

Sulphur is soluble in a solvent called carbon disulphide. Carbon is not soluble in carbon disulphide.

**74. Question**

The dyes present in fountain pen ink can be separated by the technique of :

A. fractional distillation

B. infrared photography

C. crystallization

D. chromatography

**Answer**

The mixture of different colors/dyes/inks are separated by the process of chromatography.

**75. Question**

Pure copper sulphate can be obtained form an impure sample by the process of :

A. evaporation

B. fractional distillation

C. centrifugation

D. crystallization

**Answer**

Impure copper sulphate can be purified by the method of crystallisation.

**76. Question**

The material which is added to water during purification process at the water works so as to disinfect it is :

A. Potassium permanganate

B. betadine

C. chlorine

D. potash alum

**Answer**

Process of adding chlorine (Cl) or hypochlorite to water ensures the killing of germs. This method is used to kill certain bacteria and other microbes in tap water as chlorine is highly toxic.

**77. Question**

The technique which is used to separate particles of a solid suspended in a liquid quickly is called:

A. decantation

B. centrifugation

C. sedimentation

D. filtration

**Answer**

Centrifugation is a method of separating the suspended particles of a substance from a liquid in which the mixture is rotated at a high speed in a centrifuge.

**78. Question**

Naphthalene can be separated for sand:

A. by sublimation

B. by distillation

C. by crystallisation

D. by using water as solvent

**Answer**

The process of sublimation is used to separate that component of a solid-solid mixture which sublimes on heating. Naphthalene sublimes on heating.

**79. Question**

Which of the following cannot be separated from air by the process of fractional distillation?

A. oxygen B. argon

C. hydrogen D. nitrogen

**Answer**

hydrogen cannot be separated from air by the process of fractional distillation

**80. Question**

The correct increasing order of the boiling points of liquid oxygen, liquid argon and liquid nitrogen present in liquid air is :

A. nitrogen, oxygen, argon

B. nitrogen, argon, oxygen

C. argon, oxygen, nitrogen

D. oxygen, argon, nitrogen

**Answer**

Liquid nitrogen has boiling point equal to - $190^0$C and thus turns into gas first and separated from air. The boiling point of argon is - $186^0$C, therefore it is extracted after nitrogen. The boiling point of oxygen is - $183^0$C, thus it is collected after the extraction of argon.

**81. Question**

The boiling point of liquid argon is :

A. -$196^0$C

B. -$183^0$C

C. -$186^0$C

D. -$193^0$C

**Answer**

The boiling point of argon is - $186^0$C, therefore it is extracted after nitrogen.

**82. Question**

You are given a mixture of iodine in alcohol called tincture iodine. Which method will you use to recover both, iodine as well as alcohol, from this mixture?

A. evaporation

B. simple distillation

C. fractional distillation

D. crystallization

**Answer**

(b), Distillation is a method used for the separation of components of a mixture containing two miscible liquids that boil without decomposition and have sufficient difference in their boiling points.

**83. Question**

The best way to recover sugar form an aqueous sugar solution is :

A. evaporation to dryness

B. distillation

C. filtration

D. crytallisation

**Answer**

(d), The process of cooling a hot, concentrated solution of a substance to obtain crystals is called crystallisation. It is used for obtaining a pure solid substance from impure sample.

**84. Question**

One of the following does not undergo sublimation. This one is :

A. camphor

B. dry ice

C. silica

D. iodine

**Answer**

Silica does not undergo sublimation.

**85. Question**

Which one of the following scrap metal cannot be separated by magnetic separation?

A. nickel

B. cobalt

C. chromium

D. steel

**Answer**

Chromium does not show magnetic properties.

**Questions Based on High Order Thinking Skills (HOTS)-Pg-108**

**86. Question**

The liquid air has three components X, Y and Z whose boiling points are : $-186^0$C, $-183^0$C and $-196^0$C, respectively. When liquid air is fed into a tall fractional distillation column from near its bottom and warmed up slowly:

(a) Which component will be collected from near the bottom of the fraction distillation column? Why?

(b) Which component will be collected from the top part of the fractional distillation column? Why?

(c) Which component will be collected from the middle part of the fractional distillation column? Why?

(d) What could the component X, Y and Z be?

**Answer**

(a) Y; It has the highest boiling point of, $-183^0C$

(b) Z; It has the lowest boiling point of, $-196^0C$

(c) X; It has a boiling point of, $-186^0C$, which is lower than that of Y but higher than that of Z

(d) X is liquid argon; Y is liquid oxygen; Z is liquid nitrogen

**87. Question**

There are three liquids A, B and C, all having different densities and different boiling points. Liquids A and C are organic in nature whereas liquid B is considered to be inorganic. When liquids A and B are put together in a container, they form a single layer. On the other hand, when liquids B and C are mixed, they form two separate layers:

(a) Which process will you use to separate a mixture of A and B?

(b) Which method will you use to separate a mixture of B and C?

(c) Name the liquids which would behave like (i) a (ii) B and (iii) C.

**Answer**

(a) Fractional distillation is used for the separation of a mixture of two or more miscible liquids for which the difference in boiling points

(b) A separating funnel is used for the separation of components of a mixture between two immiscible liquid phases. One phase is the aqueous phase and the other phase is an organic solvent. This separation is based on the differences in the densities of the liquids.

(c) (i) Alcohol (ii) Water (iii) Oil

**88. Question**

A solid mixture contains four constituents P, Q, R and S. P consists of tiny grains and it is mixed with cement for plastering the walls. Q is a white solid

which is recovered on a large scale from sea water by the process of evaporation. R is in the form of tiny particles of a material whose corrosion is called rusting. And S is a white solid which is used in making ordinary dry cells.

(a) What could P, Q, R and S be?

(b) How would you separate a mixture containing P, Q, R and S?

**Answer**

(a) P is sand; Q is common salt; R is iron filings; S is ammonium chloride

(b) First separate R (iron filings) by using a magnet to attract them. Then separate S (ammonium chloride) by sublimation. Shake P (sand) and Q (common salt) with water and filter. Sand is obtained as residue. Evaporate filtrate to dryness to obtain common salt.

**89. Question**

Tincture of iodine is a mixture of two materials X and Y. The material Y has a property that its solid form can be converted directly into vapours on heating by a process called Z.

(a) What could X be?

(b) What could Y be?

(c) Name the process Z.

(d) Which process would you use to recover both the components X and Y from tincture of iodine?

(e) Which process can be used to recover only component Y from tincture of iodine?

**Answer**

(a) Alcohol

(b) Iodine

(c) The process of sublimation is used to separate those substances from a mixture which sublime oh heating. Iodine has the property to sublime.

(d) Distillation is a method used for the separation of components of a mixture containing two miscible liquids that boil without decomposition and have sufficient difference in their boiling points.

(e) Evaporation is used to separate a solid substance that has dissolved in water.

**90. Question**

The given mixture contains three constituents A, B and C. The constituent A is a yellow coloured, solid element which dissolves in a liquid D. The constituents B is a blue coloured salt which is insoluble in liquid D but dissolves easily in another liquid E. The constitudent C is a liquid wlich is used in coolking food and forms a solid fat on hydrogenation.

(a) What do you think could (i) constituent A, and (ii) liquid D be?

(b) What could (i) constituent B, and (ii) liquid E be?

(c) What could liquid C be?

(d) How will you separate the mixture containing A, B and C.

**Answer**

(a) (i) Sulphur (ii) Carbon disulphide

(b)(i) Copper sulphate (ii) Water

(c) Vegetable oil

(d) Filter the mixture of A, B and C. C(oil)being liquid will be obtained as a filtrate. Residue consists of A (sulphur) and B (copper sulphate). Add water, shake and filter. A (sulphur) is obtained as residue. Evaporate filtrate to obtain B (copper sulphate).