Lakhmir Singh solutions for class 9 chemistry Chapter 2: Is Matter Around Us is Pure

Question 1:

State whether the following statement is true or false :
Milk is a pure substance.

ANSWER:

False, Milk is not a pure substance. It is a heterogeneous mixture because of its colloidal nature.

Question 2:

Name three mixtures found in nature.

ANSWER:

Three mixtures found in nature are milk, sweat and air.

Question 3:

Which of the following is a mixture ?
Salt, Air, Water, Alum, Sugar

ANSWER:

Among the given options, air is a mixture as it is composed of different gases.

Question 4:

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

ANSWER:

Mercury (metal) and bromine (non-metal), exist as liquid at room temperature.

Question 5:

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

ANSWER:

Sodium is a soft metal, whereas diamond is a hard non-metal.

Question 6:

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

ANSWER:

Graphite is a non-metal that is a good conductor of electricity.

Question 7:

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

ANSWER:

Mercury is a liquid metal that can be classified as a pure substance and a good conductor of electricity.

Question 8:

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

ANSWER:

Carbon is a solid non-metal, bromine is a liquid non-metal and oxygen is a gaseous non-metal.

Question 9:

Name the property :
(a) which allows metals to be hammered into thin sheets.
(b) which enables metals to be drawn into wires.

ANSWER:

(a) The property of metals that allows them to be hammered into thin sheets is called malleability.
(b) Ductility is the property of metals that enables them to be drawn into wires.

Question 10:

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

ANSWER:

Any element; metal or non-metal that is soft and cannot be hammered into thin sheets, shows brittleness.

Question 11:

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

ANSWER:

Malleability refers to the property of a metal that allows it to be hammered into thin sheets. Ductility refers to the property of metals that allows them to be stretched into thin wires.

Question 12:

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

ANSWER:

Non-metals are brittle in nature, which means, they cannot be hammered into thin sheets. They will be broken into smaller pieces if hammered. E.g., sulphur and phosphorus.

Question 13:

What is meant by saying that metals are sonorous ?

ANSWER:

Metals are sonorous because they generate sound when hit.

Question 14:

What is meant by saying that metals are lustrous ?

ANSWER:

Metals are said to be lustrous because of their property to shine.

Question 15:

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

ANSWER:

Materials that are made up of two or more pure substances and show the properties of their constituents are called mixtures.

Question 16:

"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 the products are different from those of the constituents.” This statement best describes a compound.

Question 17:

Name one element, one compound and one mixture.

ANSWER:

Iron (Fe) is an element.
Water (H_2O) is a compound.
Air (combination of various gases) is a mixture.

Question 18:

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

ANSWER:

A mixture is a substance that consists of two or more elements or compounds in any proportion, which might be distinct or indistinct. On the other hand, a solution is an example of homogenous mixture, *i.e*., substances in the solution are completely mixed and are indistinguishable.

Question 19:

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

ANSWER:

Elements that are neither good nor bad conductors of electricity, are called semi conductors.

Question 20:

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 ....., ... and .....\
(e) The elements which are sonorous are called .....

ANSWER:

(a) An element is made up of only one kind of atoms.
(b) Brine is a mixture, whereas alcohol is a compound.
(c) Brass is an alloy, which is considered as mixture.
(d) The three important metalloids are boron, silicon, and germanium.
(e) The elements that are sonorous are called metals.

Question 21:

Classify the following into elements and compounds :
(i) H_2O
(ii) He
(iii) Cl_2
(iv) CO
(v) Co

ANSWER:

Compounds	Elements
H_2O, CO	He, Co, Cl_2

Question 22:

Classify the following as elements or compounds :
Iron, Iron sulphide, Sulphur, Chalk, Washing soda, Sodium, Carbon, Urea

ANSWER:

Elements	Compounds
Iron, sulphur, sodium, and carbon	Iron sulphide, chalk, washing soda, and urea

Question 23:

What elements do the following compounds contain ?
Sugar, Common salt

ANSWER:

Formula of sugar is $C_{12}H_{22}O_{11}$. So, the elements present in sugar are carbon (C), hydrogen (H) and oxygen (O).
Formula of sodium chloride is NaCl. So, the elements present in sodium chloride are sodium (Na) and chlorine (Cl).

Question 24:

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

ANSWER:

Pure substances are made up of same type of particles or atoms. All the elements and compounds are pure substances because they contain the same kinds of particles.
Examples: Hydrogen, carbon dioxide

Question 25:

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

ANSWER:

Two types of pure substances are:
(a) Elements: Example: Carbon
(b) Compounds: Example: Sodium chloride (NaCl)

Question 26:

Which of the following are 'pure substances' ?
Ice, Milk, Iron, Hydrochloric acid, Calcium oxide, Mercury, Brick, Wood, Air

ANSWER:

Iron and mercury are pure substances because these are elements. Hydrochloric acid, calcium oxide, and ice are also pure substances, as they are compounds.

Question 27:

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

ANSWER:

Mixture is considered as an impure substance, as it contains two or more different kinds of particles or substances mixed together.
Examples: Milk, sea water

Question 28:

Which of the following substances are elements ?
Water, Salt, Mercury, Iron, Marble, Diamond, Wood, Nitrogen, Air, Graphite, Hydrogen, Oxygen, Sugar, Chlorine

ANSWER:

Mercury, iron, diamond, nitrogen, graphite, hydrogen, oxygen, and chlorine are elements because these cannot be split further into two or more simpler substances.

Question 29:

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

ANSWER:

Air is a mixture because:
(a) It contains two or more pure substances.
(b) It can be separated into simpler substances by physical processes.
(c) Its composition is not fixed.

Water is a compound because:
(a) Water cannot be separated into its constituents i.e., hydrogen and oxygen by physical methods.
(b) Properties of water are entirely different from those of its constituents.
(c) The composition of water is fixed.
(d) Its constituents are present in fixed proportion by mass. Water has a definite formula (H_2O).

Question 30:

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

ANSWER:

Aluminium and copper are two elements that are solid at room temperature.
Both bromine and mercury are liquid at room temperature.
Nitrogen and hydrogen are two elements that are gaseous at room temperature.

Question 31:

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

ANSWER:

Hydrogen and oxygen are considered as elements because they cannot be split further into simpler substances by usual chemical methods as they are made of one kind of atoms. On the other hand, water is not an element, as it consists of different types of atoms, i.e., hydrogen and oxygen and can be split up into its components by chemical processes.

Question 32:

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

ANSWER:

All the elements can be divided into following three groups:
(i) Metals: Examples: Aluminium and copper
(ii) Non-metals: Examples: Potassium and calcium
(iii) Metalloids: Examples: Arsenic and antimony

Question 33:

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

ANSWER:

Properties	Metals	Non-metals

Lustre	Lustrous	Non-lustrous
Heat and electrical conductivity	Good conductor	Poor conductor

Question 34:

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

ANSWER:

Properties	Metal	Non -metal
Malleability	They can be hammered into sheets without breaking.	They cannot be hammered into sheets without breaking.
Ductility	They can be stretched into thin wires.	They cannot be stretched.
Electrical conductivity	They are good conductors.	They are poor conductors.

Question 35:

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

ANSWER:

Aluminium is lustrous and malleable, so it is a metal.

Question 36:

Give reason why :
(a) copper metal is used for making electric wires.
(b) graphite is used for making elecrode in a dry cell.

ANSWER:

(a) Copper is a good conductor of electricity. It is ductile and less expensive; therefore, it is used for making electrical wires.

(b) Graphite is a non-corrosive non-metal and a poor conductor of electricity. It is also

cheap and insoluble in water, acids and bases. It is inert (does not react) to the electrolytes present in the dry cells. Thus, it makes a good material for an electrode.

Question 37:

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

ANSWER:

You can boil it and if it starts boiling at 100º C, it might be water. You can also check its reactivity with some metals such as sodium and potassium that react violently with water. The best way, to prove that it is pure water, is to do experiments to see if it has the same capabilities and chemical behaviour as water has.

Question 38:

Choose the solutions from among the following mixtures :
Soil, Sea-water, Air, Coal, Soda-water

ANSWER:

Sea-water and soda water are solutions.

Question 39:

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

ANSWER:

Air is a mixture because:
(a) it consists of different gases (and some dust),
(b) its composition is not fixed, and
(c) it can be split into its components.

Question 40:

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

ANSWER:

Water is a compound because:
(i) Water cannot be split into its constituents, hydrogen and oxygen, by physical methods.
(ii) It can only be separated into its constituents by chemical processes.
(iii) The properties of water are entirely different from those of its constituents.

Question 41:

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 combined together chemically in a fixed proportion by mass.
Sodium chloride (NaCl) is a compound because:
(a) It is made up of two elements, sodium and chlorine, and the nature of NaCl is completely different from its constituent elements.
(b) Sodium and chlorine are present in a fixed proportion in sodium chloride.

Question 42:

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

ANSWER:

A mixture consists of two or more different kinds of particles or two or more pure substances mixed together but not chemically bound.
Sugar solution is a mixture because

(a) it can be separated into its constituents by physical processes (like evaporation), and
(b) it shows properties of both sugar and water.

Question 43:

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

ANSWER:

Brass is an alloy of copper and zinc.
Brass is considered to be a mixture and not a compound because:
(a) it shows the properties of its constituents, and
(b) it has variable composition (the amount of zinc in brass varies from 20% to 35%).

Question 44:

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

ANSWER:

Characteristics	Compound	Mixture
1)Substance	Pure	Impure
2)Way of combination	Two or more components combined chemically	Two or more substances mixed physically
3)Ratio	Combine with a fixed ratio	Ratio of combination is not fixed.
4)Relation between the properties of constituent molecules and compound or mixture	The properties of the constituents are different from compound.	The properties of constituent remain unchanged in mixture.
5) Separation	The constituents of a compound can be separated by chemical methods.	The constituents of a mixture can be separated by physical methods.

Question 45:

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

ANSWER:

Solution of salt in water is a mixture and not compound because salt solution is made up of salt and water, mixed physically.
1. The constituents of salt solution might be present in varying ratios.
2. Salt solution does not have fixed properties. Its properties depend on the nature of its components and the ratios in which they are mixed.
3. The constituents of salt solution can be separated easily by physical methods, i.e., distillation.

Question 46:

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:

Similarity: In both the cases, the mixture shows the properties of its constituents and the constituents can be separated by physical methods, such as filtration, evaporation, distillation etc.

Difference: Mixture of sugar and water is a homogeneous mixture and it is considered to be a solution. On the other hand, mixture of sand and sugar is a heterogeneous mixture.

Question 47:

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

ANSWER:

We can distinguish a solution from compound by the process of distillation.
Constituents of a solution can be separated by distillation process but the constituents of a compound cannot be separated by the same.

Question 48:

Name a non-metal :
(a) which is lustrous
(b) which is required for combustion
(c) whose one of the allotrophic 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 a lustrous non-metal because it is shiny.
(b) Oxygen is a non-metal that is required for combustion.

(c) Carbon, Graphite
(d) Sulphur
(e) Carbon

Question 49:

Name a metal :
(a) which can be easily cut with a knife
(b) which forms amalgams
(c) which has no fixed shape
(d) which has a low melting point
(e) which is yellow in colour

ANSWER:

(a) Sodium can be easily cut with a knife.
(b) Mercury forms amalgams.
(c) Mercury has no fixed shape.
(d) Sodium has a low melting point.
(e) Gold is yellow in colour.

Question 50:

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, iron powder, iodine vapour and sulphur powder. aluminum foil, graphite and diamond are not compounds.

Question 51:

(a) State the main points of difference between homogeneous and heterogeneous mixtures.
(b) 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:

(a)

Homogenous Mixture	Heterogeneous Mixture
1) A homogeneous mixture is a substance that is uniform in composition.	1) A heterogeneous mixture is a mixture in which the composition is not uniform.
2) It has a single phase.	2) It has two or more phases.
3) Examples of homogenous mixture are solutions such as sugar solution, salt solution.	3) Examples of heterogeneous mixtures are sugar, sand solution, polluted air etc.

(b) Examples of homogeneous mixtures are soda water, air, vinegar, alcohol and water mixture, sugar and water mixture, copper sulphate solution. Examples of heterogeneous mixture are wood, petrol and water mixture, chalk and water mixture.

Question 52:

(a) What is meant by (i) elements (ii) compounds, and (iii) mixtures ?

Write down the names of two elements, two compounds and two mixtures.

(b) Classify the following into elements, compounds and mixtures :
Marble, Air, Gold, Brass, Sand, Diamond, Graphite, Petroleum, Common slat, Sea-water, Chalk

ANSWER:

(a) (i) Element: An element is a substance that cannot be split up into two or more simpler substances by chemical methods. It contains only one type of atoms. Examples of elements include:
Non metals: Carbon and oxygen
Metals: Aluminum, iron, copper, gold, mercury, and lead.

(ii) Compound: A compound is a substance consisting of two or more elements combined chemically in a fixed proportion by mass.
Examples: Water, sodium chloride, calcium carbonate etc.

(iii) Mixture: – A mixture is a substance that is made up of two or more different kinds of particles or two or more pure substances mixed together by a physical process. Examples: Air, milk, wood, soil etc.

(b) Elements: Gold and Diamond
Compounds: Common salt and marble
Mixtures: – Brass and seawater.

Question 53:

(a) What are (i) metals (ii) non-metals, and (iii) metalloids ?

Give two examples each of metals, non-metals and metalloids.

(b) Classify the following into metals, non-metals and metalloids :
Silicon, Mercury, Diamond, Sulphur, Iodine, Germanium, Sodium, Carbon, Magnesium, Copper, Boron, Helium

ANSWER:

(i) Metals: Metals are elements that are malleable, ductile and conduct electricity.
Examples: Aluminum and zinc

(ii) Non-metals: Non-metals are elements that are neither malleable nor ductile, and they do not conduct electricity. Most non-metals are brittle in nature.
Examples: Phosphorus, hydrogen

(iii) Metalloids: Metalloids are elements that show properties of both metals and non metals.
Examples: Germanium, silicon

(b).
(i) Metals: Mercury, sodium, magnesium, copper
(ii) Non-metals: Diamond, sulphur, iodine, carbon, helium
(iii) Metalloids: Arsenic, germanium, boron

Question 54:

(a) What is a mixture ? Give two example of mixtures.
(b) What is meant by (i) homogeneous mixtures, and (ii) heterogeneous mixtures ?

Give two examples of homogeneous mixtures and two of heterogeneous mixtures.
(c) What is the other name of homogeneous mixtures ?
ANSWER:

(a) Mixtures: Mixtures are substance that contain two or more different kinds of particles or substances mixed together by physical methods.
Examples: Air, brick

(b)
(i) Homogeneous mixtures: Mixtures in which the constituting substances are mixed together completely and are indistinguishable from one another are called homogeneous mixtures. Such mixtures have a homogeneous composition of their substances throughout the solution. Examples: Sugar solution, salt solution
(ii) Heterogeneous mixtures: Heterogeneous mixtures are mixtures in which the constituting substances remain separated and one substance is spread throughout the other substance as small particles, droplets or bubbles.
Examples: Starch solution, soap solution

(c) Other name for homogeneous mixtures is solutions.

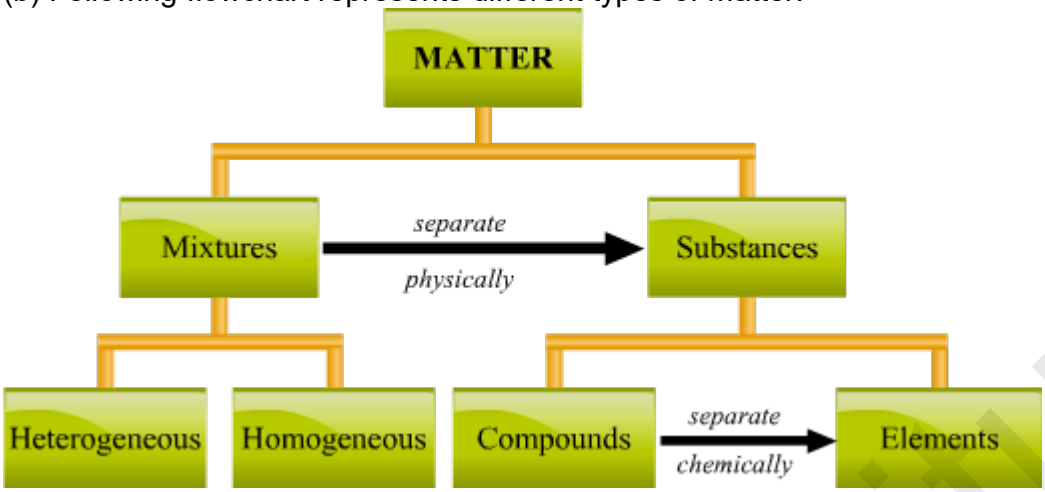
Question 55:

(a) What are the three general classes of matter ? Give one example of each type.
(b) Draw a flow-chart for the schematic representation of different types of matter.

ANSWER:

(a) Three general classes of matter are elements, compounds, and mixtures.
Element: Oxygen
Compound: Water
Mixture: Salt solution

(b) Following flowchart represents different types of matter:



Question 56:

Which of the following is not an element ?
(a) graphite
(b) germanium
(c) silica
(d) silicon

ANSWER:

(c) Silica.

Silica is a compound made up of Si (silicon) and O (oxygen) and chemically called Silicon dioxide.

Question 57:

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:

(c) (i) and (iii)

CO and NO are compounds. While CO is made up of carbon and oxygen, NO is made up of nitrogen and oxygen.

Question 58:

One of the following substances is neither a good conductor of electricity nor an insulator. This substance is :
(a) chromium
(b) germanium
(c) gallium
(d) potassium

ANSWER:

(b) germanium
Germanium is metalloid. It is neither a good conductor of electricity nor an insulator. It is a semiconductor.

Question 59:

Which of the following is not a mixture ?
(a) kerosene
(b) air
(c) alcohol
(d) petrol

ANSWER:

(c) alcohol
Air, kerosene oil and petrol are mixtures of various compounds of carbon and hydrogen (called hydrocarbons). Alcohol is a compound and not a mixture.

Question 60:

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:

(b) hydrogen
Washing soda (soda ash), Na_2CO_3 contains Na, C and O, whereas baking soda, $NaHCO_3$, is made up of Na, C, H and O. So, the element, which is not common in the two, is hydrogen.

Question 61:

"Is malleable and ductile" best describes :
(a) a solution
(b) a metal
(c) a compound
(d) a non-metal

ANSWER:

(b) a metal
Metals are malleable and ductile as they can be hammered into thin sheets and can be stretched into wires.

Question 62:

Which one of the following is not a metalloid ?
(a) boron
(b) silicon

(c) gallium
(d) germanium

ANSWER:

(c) gallium
Boron, silicon and germanium are metalloids. Gallium is a metal.

Question 63:

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:

(d) bromine and iodine
Mercury is a metal that exists in liquid state and bromine is a non-metal that exists in liquid state.

Question 64:

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:

(b) first absorbed then released

When a mixture of iron and sulphur is heated strongly, they first absorb the energy to get excited. This is followed by the formation of a new compound iron sulphide (FeS) with the release of huge amount of energy in the form of heat and light.

Question 65:

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:

(c) copper metal is ductile and has low electrical resistance
Copper is a good conductor of electricity. It means that it offers very low electric resistance. Also, it is highly ductile due to which it can be drawn into very thin wires.

Question 66:

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:

(b) an impure substance
Milk is considered to be an impure substance as it is an emulsion. Emulsion is a colloid in which minute droplets of one liquid are dispersed in another liquid, which is not miscible with it.

Question 67:

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:

(b) (i) and (iii)
A pure substance is made up of only one kind of particles like elements. The composition of pure compounds is also same throughout.

Question 68:

Which of the following are homogeneous in nature ?
(i) ice
(ii) wood
(iii) soil
(iv) air

(a) (i) and (iii)
(b) (ii) and (iv)
(c) (i) and (iv)
(d) (iii) and (iv)

ANSWER:

(c) (i) and (iv)
Ice and air are homogeneous in nature as their compositions remain same throughout.

Question 69:

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 compounds
(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:

(d) (i), (iii), and (iv)
Statements (i), (iii), and (iv) are correct. When two elements combine in a chemical reaction to give a product, the product is a compound. Composition of a compound has a fixed ratio and its properties are different from the elements participating in the reaction.

Question 70:

Which of the following does not have a fixed melting point/boiling point ?
(a) gold
(b) ethanol
(c) air
(d) oxygen

ANSWER:

(c) air
Air is a homogeneous mixture of different gases. Hence, it does not have a fixed melting or boiling point.

Question 71:

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 given set. While steam is a compound, all others are elements.

Question 72:

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) State one characteristic property of gas D.
(e) Write one test to identify gas .E

ANSWER:

(a) Here, iron powder and sulphur powder are mixed together. B is a mixture (Fe + S).

(b) Here, iron powder and sulphur powder are mixed together and heated strongly on a burner. So, C is the compound iron sulphide(FeS).

(c) (i) Here, dilute HCl was added to C (iron sulphide)to obtain D, which is hydrogen sulphide gas.
$FeS + 2HCl \rightarrow FeCl_2 + H_2S$

(ii) When dilute HCl is added to B, Fe present in the mixture reacts with the acid to form hydrogen gas.
$Fe + HCl \rightarrow FeCl_2 + H_2$

(d) Gas D smells like rotten egg.

(e) When a burning stick is held in the gas, the gas itself catches fire with blue flame and a 'pop' sound. In the process, the burning stick extinguishes.

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Question 73:

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) Which 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) Substance X does not have a fixed melting or boiling point. Moreover, it shows the properties of its constituents. So, it must be a mixture.
Sugar solution in water is a substance like X.
(b) Substance Y has a fixed melting or boiling point but it cannot be split into simpler substances by chemical processes. Hence, it must be an element.
Hydrogen is a substance like Y.
(c) Substance Z is also a pure substance whose properties are entirely different from those of its constituents. Hence, it must be a compound.
Sugar is a substance like Z.
(d). Formation of Z (a compound) involves absorption or release of an appreciable amount of energy.
(e) The three groups are metals, non-metals and metalloids. All the substances like Y are divided into these groups on the basis of their properties.

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Question 74:

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 not 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) Group of materials P is element.
(b) Q is a non-metal. Examples: Carbon(s), and bromine (l)
(c) R is a metal, as most of them are good conductors of heat and electricity. Examples: Copper, and aluminum
(d) S is a metalloid, as they have intermediate properties of those of metals and non-metals. Examples: Arsenic, and antimony
(e) R is a metal, therefore, it is malleable and ductile.

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Question 75:

A, B and C are all liquids. Liquid A has a comparatively low boiling point. On heating, liquid A vaporises 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 vaporises 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) Liquid B has a very high boiling point. It also vaporises on heating. It is a conductor of electricity and is used in making thermometers. So, B could be an element. Further, liquid B is mercury as mercury is a liquid metal, which expands on heating and is used extensively in thermometers.
(b) Liquid C has a moderate boiling point. It could be a mixture. It is a salt solution because when C is heated, it vaporises and leaves behind a white solid (salt), which is used in the process of cooking.
(c) Liquid A is used in motor vehicles as fuel, either alone or after mixing with petrol. It could be a compound because on heating, it does not leave any residue. It is alcohol as alcohol is

being used in motor vehicles nowadays.
(d) Solid D is sodium chloride. It is also known as common salt and is added in food.
(e) Liquid E is water as, on heating, liquid C, which is a salt solution, leaves water vapours. On condensing these vapours, we obtain pure water. When water is mixed with anhydrous copper sulphate, we obtain a blue colour solution. This is because of the formation of hydrated copper sulphate solution.

$CuSO_4+5H_2O \rightarrow CuSO_4.5H_2O_{\text{hydrated copper sulphate}}$CuSO4+5H2O→CuSO4.5H2Ohydrated copper sulphate

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Question 1:

Out of a colloid, solution and a suspension :
(a) which one has the smallest particles ?
(b) which one has the largest particles ?

ANSWER:

(a) Solution has the smallest particles.
(b) Suspension has the largest particles.

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Question 2:

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

ANSWER:

Dissolution of a solid in liquid form a homogenous mixture called solution. Solution is clear in nature as the solid particles (solute) in a solution are very small and get completely dissolved in the liquid (solvent).

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Question 3:

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

ANSWER:

Soap solution is a colloidal solution. Therefore, it scatters light due to large particles and creates Tyndall effect.

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Question 4:

State whether colloidal solutions are homogeneous or heterogeneous.

ANSWER:

Colloids are heterogeneous mixtures. The size of the particles in the colloids is bigger than the size of particles in the true solutions.

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Question 5:

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

ANSWER:

Percentage method is the most common way of expressing the concentration of a solution.

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Question 6:

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

ANSWER:

To make the salt solution of 15% with 15 gm as the mass of the solute, the mass of the solvent must be 85 gm.
concentration=mass of solutemass of solute + mass of solvent×100concentration=mass of solutemass of solute + mass of solvent×100
Mass of solution = mass of solute + mass of solvent
Mass of the solvent = mass of the solution – mass of solvent
= 100 – 15 = 85 gm
Therefore, 85 gm of water should be added.

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Question 7:

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

ANSWER:

Volume of solute = 12 ml
Volume of solution = volume of solute + volume of solvent
Volume of solvent = volume of solution – volume of solvent
= 100 – 12 = 88 ml

concentration=Volume of solutevolume of solute+volume of solvent×10012=1212+x×100x=88concentration=Volume of solutevolume of solute+volume of solvent×10012=1212+x×100x=88

So, 88 ml of water will be added to 12 ml of alcohol in order to prepare a concentration 12%.

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Question 8:

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% sugar solution means 5 gm of sugar is dissolved in 95 gm of water. Therefore, the correct option is “a”.

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Question 9:

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) A
15% alcohol solution means 15 ml alcohol is dissolved in 85 ml of water. Therefore “a” is the correct option.

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Question 10:

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

ANSWER:

concentration=mass of solutemass of solute+mass of solvent×100concentration=mass of solutemass of solute+mass of solvent×100

Given, Mass of salt is 2.5 gm and mass of water is 50 gm.
So, total mass of the solution = 50 gm + 2.5 gm = 52.5 gm
Hence, concentration =2.552.5×100=4.7%=2.552.5×100=4.7%

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Question 11:

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

ANSWER:

Given, Mass of urea = 16 gm
Mass of solution = 120 gm

concentration=mass of solutemass of solute+mass of solvent×100 =16120×100 =13.333%concentration=mass of solutemass of solute+mass of solvent×100 = 16120×100 =13.333%

Therefore, the concentration is 13.333%.

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Question 12:

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

ANSWER:

Volume of alcohol = 5.6 ml
Volume of water = 75 ml

So, volume of solution = 75ml + 5.6 ml = 80.6 ml

concentration=volume of solutevolume of solute+volume of solvent×100 =5.680.6×100 =6.9%concentration=volume of solutevolume of solute+volume of solvent×100 =5.680.6×100 =6.9%

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Question 13:

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

ANSWER:

Volume of acetone = 25 ml
Volume of solution = 150 ml

concentration=volume of solutevolume of solute+volume of solvent×100 =25150×100 =16.667%concentration=volume of solutevolume of solute+volume of solvent×100 =25150×100 =16.667%

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Question 14:

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

ANSWER:

When the temperature of a saturated sugar solution is increased, it would become unsaturated due to increase in solubility of the solute.

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Question 15:

Which of the following contains less solute at a given temperature and pressure ? Unsaturated solution or Saturated solution.

ANSWER:

An unsaturated solution contains less amount of solute as compared to the saturated solution at a given temperature and pressure.

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Question 16:

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

ANSWER:

Water undergoes a physical change when it is heated to a temperature of 100°C. At this temperature, the water gets converted to water vapours. This process is called evaporation. Water undergoes a chemical change when it is subjected to electricity. It splits into its constituents, oxygen and hydrogen, by the process of electrolysis.

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Question 17:

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.

ANSWER:

(a) True. Solid foam allows the gas to get dispersed in solid medium.
(b) False. Sponge is an example of solid foam.

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Question 18:

Choose one term from the following which includes the other three :
aerosol, emulsion, colloid, sol

ANSWER:

Colloid includes the other three. Aerosol, sol and emulsions are different types of colloids.

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Question 19:

Which of the following is a sol ?
Shaving cream, Milk, Fog, Soap solution, Hairspray

ANSWER:

Soap solution is a sol. Sol is a colloid in which tiny solid particles are dispersed in a liquid medium.

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Question 20:

Fill in the following blanks :
(a) Milk is a ..... solution but vinegar is a ..... solution.
(b) A colloid is a ..... mixture and its components can be separated by the technique known as .....

ANSWER:

(a) Milk is a colloidal solution but vinegar is a true solution.
(b) A colloid is a heterogeneous mixture and its components can be separated by the technique known as centrifugation.

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Question 21:

Define (a) solute, and (b) solvent

ANSWER:

(a) Solute is a substance, which is dissolved in a liquid to prepare a solution.
Examples: Sugar, salt etc.

(b) Solvent is a liquid or a medium in which the solute is dissolved.
Example: Water

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Question 22:

What is the difference between solutions and colloids ?

ANSWER:

Characteristics	Solution	Colloid

Mixture type	Homogenous mixture	Heterogeneous mixture
Scattering of light	It does not scatter light.	It scatters the beam of light and the effect created is called Tyndall effect.
Separation	It cannot be separated by filtration or centrifugation process.	It can be separated by centrifugation process.

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Question 23:

What is the difference between colloids and suspensions ?

ANSWER:

Property	Colloid	Suspension
Size of particle	1 nm − 100 nm (in diameter)	Larger than 100 nm (in diameter)
Separation	It can be separated by centrifugation process.	It can be separated by filtration process.
Tyndall effect	It shows Tyndall effect.	It does not show Tyndall effect.

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Question 24:

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

ANSWER:

Property	True Solution	Colloidal Solution
Size of the particles	< 1nm	1 – 100 nm
Nature	Homogeneous	Heterogeneous
Tyndall effect	True Solution does not show Tyndall effect.	Colloidal solution shows Tyndall effect.
Separation	Cannot be done by filtration	Separation of colloidal solution cannot be done by filtration. However, it is possible by centrifugation process.

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Question 25:

Classify the following into true solutions and colloidal solutions :
Ink, Salt solution, Starch solution, Blood, Sugar solution

ANSWER:

True Solutions: Salt solution and sugar solution.
Colloidal Solutions: Starch solution, ink, and blood

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Question 26:

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

ANSWER:

(i) The given solution is kept in a beaker.
(ii) A strong beam of light is then passed through the solution in the beaker, which is kept in a dark room.
(iii) If the path of light beam is illuminated and becomes visible, it confirms that the given solution is a colloid.

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Question 27:

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

ANSWER:

Colloidal solution is a heterogeneous mixture in which particle size is intermediate of true solution and suspension, i.e., between 1 nm to 100 nm.
When a beam of light is passed through a colloidal solution, the particles of the solution get illuminated and become visible. This is because colloidal particles scatter the light falling on them.

Question 28:

How will you distinguish a colloid from a solution ?

ANSWER:

Property	Colloid	Solution
Mixture	Heterogeneous	Homogenous
Tyndall effect	Shows scattering of light	Do not show scattering of light

Separation	By centrifugation process	Cannot be separated either by centrifugation or filtration process
Example	Milk, soap solution	Salt solution, sugar solution

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Question 29:

How will you differentiate between a suspension and a colloid ?

ANSWER:

Property	Colloid	Suspension
Size of particle	1 nm - 100 nm (in diameter)	Larger than 100 nm
Separation	By centrifugation	By filtration
Stability	Colloids are stable.	Particles of suspension are not stable.
Example	Milk, soap solution	Chalk solution, sand solution

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Question 30:

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

ANSWER:

A suspension and a solution can be differentiated by Tyndall effect. Suspensions, due to bigger size of their particles scatter the beam of light passing through them and show Tyndall effect whereas solutions have a very small particle size; hence, cannot scatter the light that passes through it.

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Question 31:

Which of the following will show Tyndall effect ? Why ?
(a) Salt solution
(b) Starch solution
(c) Milk
(d) Copper sulphate solution

ANSWER:

In the given options, starch solution and milk will show Tyndall effect because they are examples of colloidal solution. They have considerable size of particles that can cause scattering of light and make it visible. On the other hand, salt solution and copper sulphate solution are examples of true solutions. Abiding by the properties of true solution, they cannot scatter light as the size of their particles is very small; hence, they cannot show Tyndall effect.

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Question 32:

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

ANSWER:

There are five types of solutions. These are:
(a) Solution of a solid in a solid. Example: Brass is a solution of zinc and copper.
(b) Solution of a solid in a liquid. Examples: Salt solution and sugar solution
(c) Solution of a liquid in a liquid. Example: Vinegar is a solution of acetic acid in water.
(d) Solution of a gas in a liquid. Example: Soda water is a solution of carbon dioxide gas in water.
(e) Solution of a gas in a gas. Example: Air is a solution of different gases (oxygen, carbon dioxide, nitrogen, argon etc.).

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Question 33:

Classify the following into solutions, 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: Soda water, brine
Suspension: Chalk water mixture, muddy water, milk of magnesia
Colloids: Milk, shaving cream, ink, blood and smoke in the air

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Question 34:

Define the following :
(a) Sol

(b) Aerosol
(c) Emulsion
(d) Foam
Give one example of each.

ANSWER:

(a) **Sol:** Sol is a colloidal suspension of very small solid particles in a continuous liquid medium. They are quite stable and show Tyndall effect. Examples include blood, pigmented ink and paint.
(b) **Aerosol:** Aerosol is a colloidal suspension of fine solid particles or liquid droplets in a gas. Examples are clouds and air pollution such as smog and smoke.
(c) **Emulsion:** Emulsion is a colloid of two or more liquids that are normally immiscible. Examples of emulsions include milk and butter.
(d) **Foam:** Foam is formed by trapping pockets of gas in a liquid. Examples of foam include beer foam and shaving cream.

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Question 35:

What is meant by the concentration of a solution ?

ANSWER:

Concentration of a solution refers to the amount of solute present in 100 gm of solution. It is expressed by 'percentage method'. The percentage of solute can be 'by mass' or 'by volume'.
concentration of solution=mass of solutemass of solvent×100concentration of solution=mass of s olutemass of solvent×100

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Question 36:

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

ANSWER:

(i) If a saturated solution is heated to a higher temperature, it becomes unsaturated. In this unsaturated solution, more solute can now be added. In other words, the saturation point of a solution increases with the increase in temperature. It occurs due to increase in solubility of the solute.

(ii) If a saturated solution is cooled to a lower temperature, some of its dissolved solutes get

separated in the form of solid crystals. This process is called crystallisation. It occurs because the solubility of the solute in the solution decreases on cooling.

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Question 37:

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

ANSWER:

According to the question:
60 gm of water dissolves 21.5 gm of NaCl.
So, 100 gm of water will dissolve =21.560×100=35.8 g of NaCl=21.560×100=35.8 g of NaCl
Thus, the solubility of NaCl = 35.8 gm

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Question 38:

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:

According to the question:
30 gm of water dissolves 9.72 gm of KCl.
So, amount of KCl that gets dissolved in 100 gm of water =9.7230×100=32.4=9.7230×100=32.4
Thus, the solubility of KCl = 32.4 gm

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Question 39:

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 – Chemical change
iv. Dissolving salt in water – Physical change
v. Digestion of food – Chemical change
vi. Melting of ice – Physical change

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Question 40:

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 magnesium wire – Chemical change
(b) Freezing of water – Physical change
(c) Rusting of iron – Chemical change
(d) Glowing of electric bulb – Physical change

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Question 41:

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:

(a) Formation of curd from milk – Chemical change
(b) Condensation of steam – Physical change
(c) Growth of plant – Chemical change
(d) Breaking of a glass tumbler – Physical change

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Question 42:

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 change: Sublimation of a solid, making a fruit salad from raw fruits, formation of clouds, and dissolution of carbon dioxide in water
Chemical change: Decomposition of water into hydrogen and oxygen by passing electric current (electrolysis)

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Question 43:

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 change: Melting of candle wax, mixing of iron fillings and sand, breaking of of chalk, and cutting of paper
Chemical change: Burning of candle wax, burning of wood, and burning of paper

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Question 44:

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

ANSWER:

Seawater can be termed as homogeneous as well as heterogeneous mixture.
Seawater is basically a salt solution, which is termed as homogeneous. But the concentration of salt in the sea can vary from place to place. It depends on environmental factors. Hence, seawater is considered heterogeneous as well.

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Question 45:

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, and ammonium chloride solution do not show Tyndall effect because the particles in these solutions are too small to scatter light in different directions.

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Question 46:

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

ANSWER:

(a) Physical change: These are changes in which no new substances are formed. These are temporary changes, which are easily reversible. The substance, which is involved in a physical change, does not lose its identity.
Examples:
(i) Water, if boiled, can be cooled and condensed.
(ii) Mixing of iron fillings with sand is a physical change because they can be separated by a magnet.

(b) Chemical change: These changes occur when a substance combines with another to form a new substance. These processes are called chemical reactions and, in general, are not reversible except by further chemical reactions.
Examples:
(i) Rusting of iron
(ii) Burning of paper

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Question 47:

(a) Give the main difference between physical changes and chemical changes.
(b) 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:

(a) Important differences between a physical and a chemical change are given below:

PHYSIAL CHANGE	CHEMICAL CHANGE
1. No new substance is formed.	1. A new substance is formed.
2. Physical change is reversible.	2. Chemical change is usually irreversible.
3. It is a temporary change.	3. It is a permanent change.
4. No heat energy is evolved or absorbed.	4. Heat energy is evolved or consumed in a large amount.
5. Examples: Melting of ice, formation of clouds, tearing of cloth etc.	5. Examples: Rusting of iron, ripening of fruits, cooking of food etc.

(b) (i) Breaking of a glass bottle is a physical change because each of the broken piece of bottle is still a glass and no new substance has been formed. In the process, only the shape and size of bottle change.

(ii) Burning of coal in air is a chemical change because the burnt coal cannot be obtained back and it is an irreversible change.

(iii) Preparation of a cake is a chemical change as all the raw materials that go inside the mixture get cooked after baking and the process cannot be reversed.

(iv) Knitting sweater from wool is a physical change as we can obtain back the wool from the sweater. So, it is a reversible process.

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Question 48:

(a) Define solubility of a substance. How does it vary with temperature ?
(b) What do you understand by the statement " the solubility of copper sulphate in water at 20°C is 20.7 g" ?
(c) What is the effect of temperature on the solubility of solids in liquids ?

ANSWER:

Solubility is a property of a solid, liquid, or gaseous chemical solute to dissolve in a solid, liquid, or gaseous solvent to form a homogeneous solution.
Solubility of a given solute in a given solvent depends on temperature. For many solids

dissolved in liquid water, the solubility increases with temperature up to 100°C. In liquid water at high temperatures (e.g., that approaching the critical temperature), the solubility of ionic solutes tends to decrease due to change in the property and structure of liquid water. The lower dielectric constant results in a less polar solvent.
Gaseous solutes exhibit more complex behavior with temperature. As the temperature is raised, gases usually become less soluble in water (to minimum, which is below 120°C for most permanent gases), but they are more soluble in organic solvents.

(b) This statement means that 20.7 gm of copper sulphate can be dissolved in 100 gm of water at 20°C.

(c) Solubility of solids in liquids generally increases on increasing the temperature and decreases on decreasing the temperature of the solvent.

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Question 49:

(a) What is meant by a solution ? Give two examples of solutions.
(b) What is a suspension ? Give two examples of suspensions.
(c) What is a colloid ? Give two examples of colloids (or colloidal solutions)

ANSWER:

(a) Solution is a homogeneous mixture composed of one phase only. In such a mixture, a solute is a substance dissolved in another substance, known as a solvent. The solvent dissolves the solute in it. The solution more or less takes on the characteristics of the solvent including its phase. Moreover, the solvent is commonly the major fraction of the mixture.
Example: Sugar solution, vinegar, metal alloys

(b) A suspension is a heterogeneous fluid containing solid particles that are sufficiently large for sedimentation. The solids get dispersed throughout the fluid through mechanical agitation with the use of certain suspending agents.
Example: Chalk-water mixture, flour in water, milk of magnesia

(c) Colloidal solution is a heterogeneous mixture, wherein the particle size of the substance is intermediate of true solution and suspension, i.e., between 1 nm to 100 nm. Like true solutions, colloidal particles are small enough and cannot be seen through naked eye. They easily pass through the filter paper. However, these particles are big enough to be blocked by parchment paper or animal membrane.
Example: Starch solution, ink

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Question 50:

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

(b) 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:

(a) A saturated solution is one that does not allow dissolution of additional solutes in it at a specific temperature.
An unsaturated solution is one that allows dissolution of additional solutes in it at the same temperature.

If a crystal dissolves in a solution, the solution is said to be unsaturated. This is because an unsaturated solution is capable of dissolving additional solutes into it.

A saturated solution does not dissolve additional solutes or crystals in it. Therefore, the crystal keeps its size when it is put in a saturated solution.

On cooling the solutions, the saturated solution will first form crystals.

(b) We will dissolve sodium chloride or NaCl in water in room temperature, till the water can no longer dissolve any more salt. By doing so, we will obtain a saturated solution of sodium chloride.
If the temperature is lowered from 25°C to 10°C, some of its dissolved solutes will get separated in the form of solute crystals due to the decrease in solubility of the solute.

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Question 51:

One of the following is a solid foam. This one is :
(a) butter
(b) bread
(c) shaving cream
(d) ruby

ANSWER:

(b) bread
Solid foam is a colloid in which a gas is dispersed in a solid medium. Bread is an example of solid foam.

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Question 52:

Which of the following is not an emulsion ?
(a) milk
(b) butter
(c) face cream
(d) shaving cream

ANSWER:

(d) shaving cream
Shaving cream is not an emulsion but foam.

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Question 53:

One of the following does not show Tyndall effect. This one is :
(a) soap solution
(b) ink
(c) sugar solution
(d) starch solution

ANSWER:

(c) sugar solution
Sugar solution does not show Tyndall effect because sugar solution is a true solution and not a colloid.

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Question 54:

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:

(c) chalk powder in water mixture
Chalk in water will most likely scatter the beam of light when passed through it because it forms a suspension.

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Question 55:

Milk of Magnesia is :
(a) colloid
(b) a true solution
(c) a homogeneous mixture
(d) a suspension

ANSWER:

(d) suspension
Milk of magnesia is a suspension of magnesium hydroxide in water. It has milk like texture.

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Question 56:

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) 204 g
Solubility of a substance in water is defined as the maximum amount of solute that can be dissolved in 100 g of water at a given temperature. The solubility of sugar in water at 20ºC is 204 g.

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Question 57:

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:

(c) sublimation of naphthalene
Sublimation of naphthalene is not a chemical change because it only allows naphthalene to change its state from solid to vapour. No new compound is formed and the vapour can again be condensed to solid form.

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Question 58:

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) brine
Brine is salt solution. When it is heated, water will evaporate and salt will be left as residue.

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Question 59:

Which of the following can be called a suspension ?
(a) milk
(b) milk of magnesia
(c) salt solution
(d) vinegar

ANSWER:

(b) milk of magnesia
Milk of magnesia is a suspension of magnesium hydroxide in water. It has a milk-like texture. The particles are suspended in the solvent. Milk is a colloid, whereas salt solution and vinegar are solutions.

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Question 60:

One of the following represents the solution of solid in a solid. This one is :
(a) boron
(b) brass
(c) beryllium
(d) bread

ANSWER:

(b) brass
Brass is an example of solution of solid in solid. It is an alloy of copper and zinc.

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Question 61:

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) corrosion and it is a chemical change
Rusting of iron takes place in the presence of air (O_2) and water vapour. Action of air and moisture on iron converts it to its oxide. This process is called corrosion and it leads to the formation of a new compound. Therefore, it is a chemical change.

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Question 62:

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:

(d) homogeneous and does not show tyndall effect

Sulphur dissolves completely in carbon disulphide. So, it forms a homogeneous solution. As the particles of solute are too small to scatter light, they will not cause tyndall effect.

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Question 63:

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) iodine in alcohol
Iodine dissolved in alcohol is called tincture of iodine.

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Question 64:

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 a 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) (i), (iii) and (iv)

The process in statement (ii) is a chemical change because rusting causes formation of a

new compound. Other statements are examples of physical changes where no new compounds are formed. In the process mentioned in other statements, original form of iron can be obtained back from moulded forms.

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Question 65:

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) (i) and (ii)

The processes in statements (i) and (ii) are chemical changes because decaying and burning causes formation of new compounds; thus they are chemical reactions. The processes in statements (iii) and (iv) are physical changes where no new compounds are formed.

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Question 66:

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:

The instruction written on the bottles of indigestion mixtures is “shake well before use”. This is because indigestion mixtures are suspensions. If they are left undisturbed, the particles of suspensions settle down. Therefore, it is instructed to shake the bottle before using it.

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Question 67:

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) Mixtures like A are known as suspensions.
(b) Mixtures like B are known as colloids.
(c) Mixtures like C are known as true solutions.
(d) The phenomenon exhibited by A and B, which occur on passing a beam of light through them, is called Tyndall effect.
(e) (i) Mud water mixture is like A.
(ii)Soap solution is a mixture like B.
(iii)Sugar solution is a mixture like C.

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Question 68:

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 B 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 solid 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)When solid A is dissolved in water, chemical change takes place. This is because the properties of products B and C are entirely different from those of solid A and water.
(b) Physical change occurs when solid D is dissolved in water. This is because product E shows the properties of both, solid D and water.
(c) Sodium metal could behave like solid A.
Product B is sodium hydroxide.
Product C is hydrogen.
(d) Solid D is ammonium chloride.
(e) D can be recovered from E by evaporation.

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Question 69:

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 solutions 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 lie Y ?

ANSWER:

(a) X type of solutions is known as unsaturated solution.
(b) Y type of solutions is known as saturated solution.
(c) If solution Y at 30°C is cooled down to 10°C by keeping the beaker in crushed ice, some of the dissolved parts of the solid will separate from the solution and will settle at the bottom of the beaker as crystals. This occurs because of the decrease in the solubility of solids and reduction in temperature.
(d) Solubility refers to the amount of a solid dissolved in 100 grams of water.

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Question 70:

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

What mass of ammonium chloride would be needed to make a saturated solution of ammonium chloride in fifty grams of water at 40°C ?

ANSWER:

Given that,
Solubility at 40°C = 41 gm
solubility = Solid dissolved in 100 grams of water in a solution
So, mass of ammonium chloride, required to make a saturated solution of ammonium chloride, in 50 gm of water at 40°C = 412g412g = 20.5 gm

Page No 105:

Question 1:

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

ANSWER:

Carbon disulphide can be used as a solvent to separate the mixture of sulphur and carbon.

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Question 2:

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

ANSWER:

Process of sublimation can be used to separate a mixture of sodium chloride and ammonium chloride.

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Question 3:

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

ANSWER:

Sublimation can be used to separate the mixture of naphthalene and common salt.

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Question 4:

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

ANSWER:

Process of sublimation can be used to separate the mixture of anthracene and copper sulphate.

Page No 105:

Question 5:

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

Salt and Camphor

ANSWER:

Camphor can be separated from its mixture with salt by the process of sublimation.

Page No 105:

Question 6:

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

ANSWER:

Electromagnets are fitted in cranes to separate scrap iron objects from a heap of waste material in factories.

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Question 7:

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

ANSWER:

Iodine's property of sublimation can be used to separate the mixture of salt and iodine.

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Question 8:

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

ANSWER:

Miscible liquids can be separated by the process of fractional distillation, which is based on the principle of difference in the boiling points of the constituents of a mixture.

Page No 105:

Question 9:

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

ANSWER:

The property that enables the separation of two miscible liquids by fractional distillation is the difference in their boiling points.

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Question 10:

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

ANSWER:

Water and alcohol, from a mixture of water and ethanol can be separated by fractional distillation.

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Question 11:

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

ANSWER:

Kerosene and water are two immiscible liquids which can be separated by using a separating funnel.

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Question 12:

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. Because alcohol is separated from the mixture of alcohol and water by distillation.
(b) True. As water can undergo the process of evaporation forming vapours, which can be collected in a separate container and can be easily separated from a salt solution.

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Question 13:

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

ANSWER:

Air is the major source of nitrogen and oxygen.

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Question 14:

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

ANSWER:

Various gases of air are separated by fractional distillation.

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Question 15:

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

ANSWER:

Iron nails are attracted by magnet. Thus, they can separated from saw dust using magnetic separation.

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Question 16:

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

ANSWER:

Mixture of camphor and common salt can be separated by sublimation.

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Question 17:

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

ANSWER:

Mixture of alcohol and water can be separated by distillation.

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Question 18:

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

ANSWER:

Process of filtration can be used to separate a mixture of chalk powder and water.

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Question 19:

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

ANSWER:

Filtration can be used to separate a mixture of salt solution and sand.

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Question 20:

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

ANSWER:

Evaporation can be used to obtain salt from an aqueous salt solution.

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Question 21:

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

ANSWER:

Centrifugation is used in milk dairies to separate cream from milk.

Page No 105:

Question 22:

State one application of centrifugation.

ANSWER:

Centrifugation is used to separate cream from milk.

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Question 23:

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

ANSWER:

Filtration is the process by which tea-leaves are separated from prepared tea.

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Question 24:

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

ANSWER:

We would use the process of distillation to separate a mixture of water and alcohol.

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Question 25:

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

ANSWER:

We would use a separating funnel to separate oil from water.

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Question 26:

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

ANSWER:

The differences in the properties of oil and water that enable their separation by separating funnel are:
(i) Oil and water are immiscible liquids.
(ii) Oil and water have different densities.

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Question 27:

(a) Name the process by which common salt is obtained from sea-water.
(b) Name the process by which common salt is purified.

ANSWER:

(a) Common salt is obtained from seawater by the process of evaporation.
(b) Common salt is purified by the process of crystallization.

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Question 28:

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

ANSWER:

An impure sample of copper sulphate can be purified by the process of crystallization.

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Question 29:

(a) Name the process by which all the dye can be recovered from black ink.
(b) Name the process by which the various 'dyes' (coloured materials) present in black ink can be separated.

ANSWER:

(a) The process of evaporation can be used to recover all the dye from black ink.
(b) Paper chromatography is the process by which various 'dyes' (coloured materials) present in black ink can be separated.

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Question 30:

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

ANSWER:

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

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Question 31:

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

ANSWER:

Chromatography is a technique that can be used to detect and identify traces of poison in the stomach of a person.

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Question 32:

Fill in the following blanks with suitable words :
(a) Miscible liquids are separated by .....
(b) Immiscible 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 on 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, it can be separated by using a .....

ANSWER:

(a) Miscible liquids are separated by fractional distillation.
(b) Immiscible liquids are separated by using a separating funnel.
(c) A mixture of kerosene and petrol can be separated by fractional distillation.
(d) The separation of liquids by fractional distillation is based on the difference in their boiling points.
(e) The gases of air can be separated by fractional distillation of liquid air because they have different boiling points.
(f) A heterogeneous mixture of liquid and solid is conveniently separated by centrifugation.
(g) If a mixture contains iron fillings as one of the constituents, it can be separated by using a magnet.

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Question 33:

How will you separate a mixture containing sand and sugar ?

ANSWER:

We will use filtration to separate a mixture of sand and sugar. Sugar dissolves in water but sand does not. These properties of sugar and sand allow them get separated by filtration. In filtration, suspension can be filtered using a filter paper leaving sand as residue on the filter paper. Now, the filtrate contains sugar only. Sugar can further be recovered from the filtrate.

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Question 34:

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

ANSWER:

The differences in the properties of common salt and sand that enable us to separate a mixture of these two substances are:
(a) Difference in the solubility of sand and salt. Salt is soluble in water, whereas sand is not. Therefore, we can separate sand from salt by taking water as solvent in the process of filtration.
(b) Salt is a solid that cannot vaporise. Thus, it can be obtained by the process of evaporation. In this process, all the water will evaporate leaving behind common salt.

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Question 35:

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

ANSWER:

Separation of common salt and sand from a mixture involves the processes of filtration, followed by evaporation.
Sand can be separated from a mixture of sand and salt solution (salt dissolved in water) by filtration. After filtration, sand remains on the filter paper as a residue. Common salt can now be obtained from the filtrate by boiling it. Boiling causes all the water to evaporate and salt is left behind. This process is called evaporation.

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Question 36:

How would you separate a mixture of sugar and salt?

ANSWER:

We will separate a mixture of sugar and salt by filtration followed by evaporation. In this process, solvent used is alcohol instead of water because of the difference in solubility of salt and sugar in alcohol. Salt is insoluble in alcohol but sugar is soluble in it. The undissolved salt can be obtained by filtration.
The filtrate now has only sugar dissolved in alcohol. On heating, alcohol evaporates and sugar is left behind.

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Question 37:

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

ANSWER:

Two processes are involved in separation of sodium chloride and sand, i.e., filtration followed by evaporation. The mixture of sodium chloride and sand can be separated by the following method:

• Take the mixture of sodium chloride and sand in a china dish. Pour some water in the mixture of sodium chloride and sand.
• After few seconds, all the sodium chloride will dissolve in water but sand will not.
• Then pour the contents of the container in a funnel fitted with a filter paper.
• Sand remains on the paper as residue and sodium chloride dissolved in water passes through it to the funnel.
• Now put the salt solution of the funnel on heat. Water starts getting evaporated leaving salt as residue in the funnel.
• Remove the funnel from heat.

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Question 38:

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

ANSWER:

A mixture of sand and potash alum is separated by filtration followed by evaporation. The mixture contains two constituents, i.e., potash alum and sand.
Mix both the constituents thoroughly with water so that potash alum gets dissolved in water. However, sand, being insoluble in water, will not get dissolved in it. On filtering the liquid, the solid that is left behind will be the sand, and the liquid will be a solution of potash alum. Potash alum can now be re-crystallized by heating the solution gently. In the process, all the water gets evaporated leaving behind potash alum.

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Question 39:

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

ANSWER:

We would obtain sodium chloride from a mixture of sodium chloride and sulphur by using carbon disulphide as a solvent instead of water. Sulphur is soluble in carbon disulphide, whereas sodium chloride is not. So, we can mix sulphur and sodium chloride in carbon disulphide as all the sulphur will get dissolved and sodium chloride will remain insoluble. Then, sodium chloride can be obtained from the mixture by filtration, where it would be obtained as a residue.

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Question 40:

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

ANSWER:

We would separate iodine from a mixture of iodine and common salt by the process of sublimation. In the process, iodine sublimes on heating, whereas salt does not. Salt has a melting point higher than that of iodine. Therefore, a mixture of iodine and sodium chloride can be separated by using a sublimation apparatus, where solid iodine is collected by condensation of the mixture.

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Question 41:

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

ANSWER:

Sublimation method is used to separate a mixture of camphor and sand.
Camphor is a volatile solid and can be separated from any other non-volatile substance by heating. Sand is a non-volatile substance. When a mixture of sand and camphor is heated, sand will remain in the container but camphor will vaporise. These vapours are collected and condensed on a cold surface.

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Question 42:

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

ANSWER:

We can separate a mixture of iron filings and powdered carbon by using a magnet. The principle behind the separation of iron fillings and powdered carbon is the property of iron to get attracted by magnets. When the magnet is brought close to the mixture, iron fillings are attracted by the magnet and get collected on the surface of the magnet. In the process, powdered carbon is left behind as residue.

Page No 106:

Question 43:

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

ANSWER:

We can separate a mixture of iron filings and sulphur powder by using a magnet. The principle behind the separation of iron fillings and sulphur powder is the property of iron to get attracted by magnets. When the magnet is brought close to the mixture, iron fillings are attracted to the magnet and get collected on the surface of the magnet. In the process, sulphur powder is left behind as residue.

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Question 44:

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

ANSWER:

Scrap iron is separated from a heap of waste materials in factories by using large electromagnets fitted to a crane. The electromagnet fitted crane is moved up and away from the waste to drop these scrap iron objects at a separate place. Electromagnets are used for this purpose because one can switch on and off the supply of magnetism during the process of lifting and dropping of the iron pieces.

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Question 45:

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

ANSWER:

The impurity of iron present in several substances in the industries is removed using electromagnets. Waste materials supplied to the industries contain a number of scrap metals including iron.
Iron objects stick to the electromagnet and are collected at a separate place, leaving behind other objects.

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Question 46:

How will you separate iron pins from sand ?

ANSWER:

We will use magnet to separate iron pins from sand. The property of iron to get attracted towards a magnet is used to separate it from sand.
A magnet is moved on the surface of the mixture. Iron pins are attracted by the magnet. They cling to the poles of the magnet and get separated. This process is repeated till all the iron pins are separated.

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Question 47:

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

ANSWER:

We will separate a mixture of common salt, sulphur powder and sand by the procedure based on the solubility of these compounds.
Sulphur is soluble in carbon disulphide but insoluble in water. Common salt is soluble in water but insoluble in carbon disulphide. Sand is insoluble in both.
When sand, common salt and sulphur is added to water and stirred vigorously, common salt will dissolve in water but others will not. The solution is then filtered using a filter paper. Filtrate containing common salt is subjected to evaporation to obtain salt.
The residue left on the filter paper contains sand and sulphur. Now, this residue is dissolved in carbon disulphide. Here, sulphur dissolves but sand remains undissolved. This is filtered again to leave behind sand as residue and sulphur solution as filtrate. The filtrate is then subjected to heating to evaporate carbon disulphide and obtain sulphur.

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Question 48:

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

ANSWER:

We will separate a mixture of kerosene oil, water and sand by the following process:
1. First, we can separate sand from mixture by passing it through a filter paper or by decantation.
2. After that, we get a mixture of kerosene and water. Leave it undisturbed for some time. Kerosene, being less dense than water, starts floating on it. By using a separating funnel, we can separate the mixture of kerosene and water.
3. Another process is by distillation. Water has a low boiling point (100°c), which allows it to evaporate easily. But kerosene having a boiling point of 175°C will remain undisturbed. Care should be taken as kerosene is inflammable.

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Question 49:

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

ANSWER:

The method of separating a mixture containing common salt, sand and ammonium chloride employs three processes, i.e., sublimation followed by filtration and evaporation. To separate ammonium chloride from the mixture, we should first follow sublimation. In the process, ammonium chloride gets sublimed and a mixture of sand and salt is left behind. To separate salt from the mixture, we should put the mixture in water. Salt will get dissolved in water and the insoluble sand will be obtained by filtration.
Lastly, salt is separated by evaporating the filtrate, where all the water evaporates leaving behind solid salt.

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Question 50:

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

ANSWER:

We will use the following methods to separate camphor, common salt and iron nails from their mixture:

Take the mixture and pour it in a beaker of water. On stirring, salt will dissolve, while iron nails and camphor will not. Fold a fluted piece of filter paper and put it on the funnel. Then filter the mixture to another beaker. The salt solution will pass through and iron filings and camphor will remain on the paper. Put the filtrate into an evaporating dish and heat it over a Bunsen burner so that the water will evaporate. Eventually, salt will be left behind. Pass the magnet over the camphor and iron filings. The magnet will attract the iron, leaving behind camphor as residue.

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Question 51:

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

ANSWER:

By using evaporation and separating funnel process, we can separate the ground nut oil and common salt from the given mixture. First pour the mixture in a separating funnel and leave it for some time. As both salt solution and oil are immiscible, water settles down and oil will keep floating because of the difference in their densities. Now, open the stop–cock and take out the salt solution in the beaker. Ground nut oil is left in the funnel. After this, put the beaker on the funnel. Water will evaporate and salt will be left behind as residue.

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Question 52:

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

ANSWER:

The method of separating a mixture containing chalk powder, iron filings and naphthalene employs the use of a magnet followed by sublimation. At first, a magnet is moved over the mixture. Iron fillings are attracted by the magnet and get separated. Then the chalk powder and naphthalene are separated by sublimation. In this process, the mixture of chalk powder and naphthalene is heated. Naphthalene sublimes on heating, and its vapours are condensed over a cold apparatus. Chalk powder, being nonvolatile, is left behind as residue.

Page No 106:

Question 53:

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

ANSWER:

Following steps are involved in separation of iron filings, chalk powder and common salt:
(1) At first, a magnet is moved on a mixture of iodine, iron fillings and salt. Due to the magnetic property of iron, iron fillings are separated by the magnet.
(2) As all the iron is removed, the mixture now contains iodine and salt. Iodine sublimes on heating but salt does not. So, on heating the mixture, we obtain the vapours of iodine.
(3) Vapours of iodine are condensed in a cold apparatus. Salt remains behind as residue. Therefore, the components of mixture get separated.

Page No 106:

Question 54:

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

ANSWER:

We will separate a mixture of iron filings, chalk powder and common salt by using a magnet followed by filtration and evaporation.
First, a magnet is moved on a mixture of iron filings, chalk powder and common salt. In the process, iron filings are separated by the magnet. After that, chalk powder and common salt are mixed in water. Salt dissolves in water but chalk powder does not. So, chalk powder is separated by filtration. On heating the filtrate, all the water is evaporated and salt crystals are left behind.

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Question 55:

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

ANSWER:

We will separate common salt, sand and iron filings from their mixture by using a magnet, filtration and evaporation.
First, a magnet is moved over a mixture of iron filings, sand and common salt. In the process, iron filings are separated by the magnet. After that, sand and common salt are mixed in water. While salt dissolves in water, sand does not. So, sand is separated by filtration. On heating the filtrate, all the water evaporates from the mixture and salt crystals are left behind.

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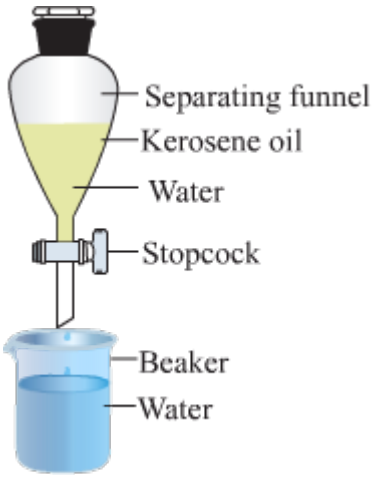
Question 56:

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

ANSWER:

We will separate a mixture of kerosene oil and water using a separating funnel. Kerosene and water are immiscible liquids. They have difference in their densities.
Kerosene has lower density, i.e., it is lighter than water. So, it will form the upper layer and water will form the lower layer. On opening the stop-cock, the lower layer of water comes out first and is collected in a beaker. Kerosene is left behind in the separating funnel.



Page No 106:

Question 57:

How will you separate water from mustard oil ?

ANSWER:

We will separate water from mustard oil by using a separating funnel. Due to the difference in the densities of the two liquids, mustard oil, being lighter than water, floats over it and forms the upper layer, whereas water forms the lower layer. On opening the stop-cock, the lower layer of water comes out first and is collected in a beaker. Mustard oil is left behind in the separating funnel.

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Question 58:

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

ANSWER:

We will separate cooking oil and water by using a separating funnel as cooking oil and water are two immiscible liquids. Due to the difference in the densities of the two liquids, cooking oil, being lighter than water, floats over it and forms the upper layer, whereas water forms the lower layer. On opening the stop-cock, the lower layer of water comes out first and is collected in a beaker. Cooking oil is left behind in the separating funnel.

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Question 59:

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

ANSWER:

We will separate a mixture of mercury, oil and water by using a separating funnel. These three substances have different densities and boiling points. Mercury, being the heaviest among the three, comes out first via stop-cock. The density of water is lower than mercury but higher than oil. So, it forms the middle layer. Oil has lowest density among the three, and therefore it forms the upper layer. These liquids are then separated from the funnel layer by layer.

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Question 60:

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

ANSWER:

The method for separating a mixture of iron filings and sulphur powder, employs the use of carbon disulphide as a solvent followed by filtration and evaporation.
Sulphur dissolves in carbon disulphide, whereas iron does not. So, the solution will contain undissolved iron in it. This can then be filtered using a filter paper, where iron remains as residue and is collected on the filter paper. The filtrate obtained contains sulphur dissolved in it. On evaporating the solvent of the filtrate, we obtain sulphur.

Page No 106:

Question 61:

How is cream separated from milk ?

ANSWER:

Cream is separated from milk by the process of centrifugation. It is the process of separating the suspended particles from a liquid. The mixture is rotated at high speed in a centrifuge.
When milk is centrifuged, the cream and skimmed milk are separated. Cream, being lighter, starts floating on the skimmed milk and hence, can be separated.

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Question 62:

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

ANSWER:

Impure copper sulphate can be purified by crystallization. Crystallization is a chemical solid–liquid separation technique in which mass transfer of a solute from the liquid solution to a pure solid crystalline phase occurs.
Impure copper sulphate can be dissolved in minimum amount of water to prepare copper sulphate solution. It is then filtered to remove insoluble impurities. Now, copper sulphate solution is heated gently on a water bath to evaporate water and obtain a saturated solution. Heating should be stopped when all the water evaporates. The saturated solution of copper sulphate is then allowed to cool slowly. Crystals of pure copper sulphate are formed leaving behind impurities.

Page No 106:

Question 63:

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

ANSWER:

Crystallization is a better than evaporation for recovering sugar from sugar solution. During evaporation, sugar can get charred on heating. However, in crystallization, no such problem occurs and we can get pure crystals of sugar.

Page No 106:

Question 64:

What is chromatography ? State its two applications.

ANSWER:

Chromatography is a technique used for separating two or more dissolved solids, which are present in the solution in small quantities.
Separation is based on the fact that two or more substances are soluble in the solvent but their solubility is different.
This technique has various important applications:
• To separate dyes present in black ink
• It is used in forensic science to detect and identify the trace amounts of poison present in the stomach.

Page No 106:

Question 65:

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:

Water and kerosene mixture can be separated by using a separating funnel because these two are immiscible liquids and differ in their densities. Kerosene is less dense than water and water comes out first from the separating funnel.
On the other hand, acetone and water mixture cannot be separated by using a separating funnel because they are miscible liquids. They are rather separated by fractional distillation.

Question 66:

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 separation possible.

ANSWER:

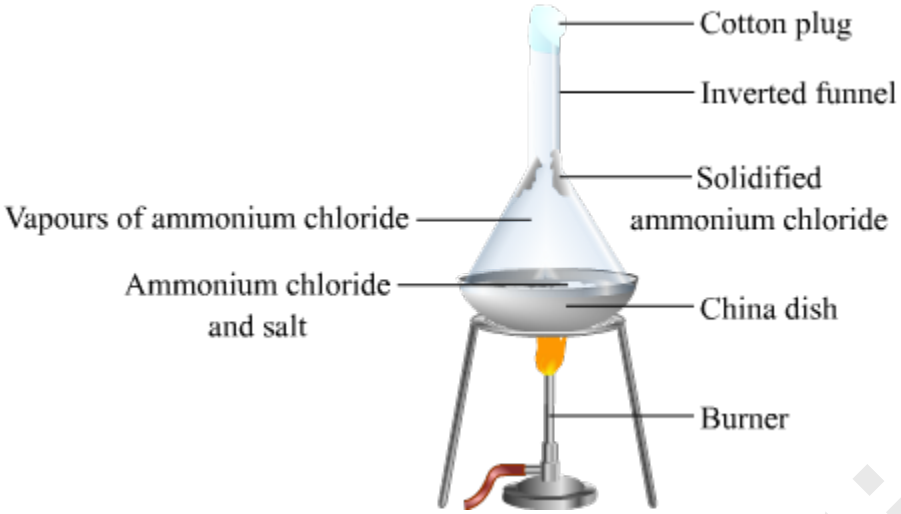


Fig., Separation of mixture of common salt and ammonium chloride by sublimation.

Sublimation is a method used for separating ammonium chloride from a mixture of ammonium chloride and common salt.

The procedure of separation is as follows:
• Mixture of common salt and ammonium chloride is taken in a china dish.
• This mixture is then kept on a burner.
• The china dish is covered with an inverted glass funnel.
• A loose cotton plug is placed over the open end of the funnel to prevent vapours from escaping.
• Mixture of common salt and ammonium chloride is then heated.
• Vapours of ammonium chloride are formed. These vapours, on rising, get condensed after coming in contact with the cold inner walls of the funnel.
• A white solid of pure ammonium chloride is obtained.
• Common salt does not change into vapours. So, it remains in the china dish.

This separation of ammonium chloride and common salt has been made possible by the difference in the properties of ammonium chloride and common salt. Ammonium chloride has a property to sublime, i.e., to get converted directly from solid to vapour state. However, common salt lacks this property. Also, ammonium chloride is a volatile substance, whereas common salt is nonvolatile in nature.

Question 67:

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

ANSWER:

We can obtain pure water from a saltwater mixture (or salt solution) by the process of distillation. Important steps underlying the process are as follows:

• The salt water mixture is taken in a distillation flask and heated subsequently.
• On heating, water vapours are formed that rise up and come through the side tube B.
• It is then passed through condenser C.
• Cold water from the tap is circulated in the outer tube of the condenser, so that the hot vapours are cooled.
• The vapours condense and are collected in another beaker.
• This pure water is called distilled water.
• Salt, being non-volatile, remains in the flask and can be obtained later.

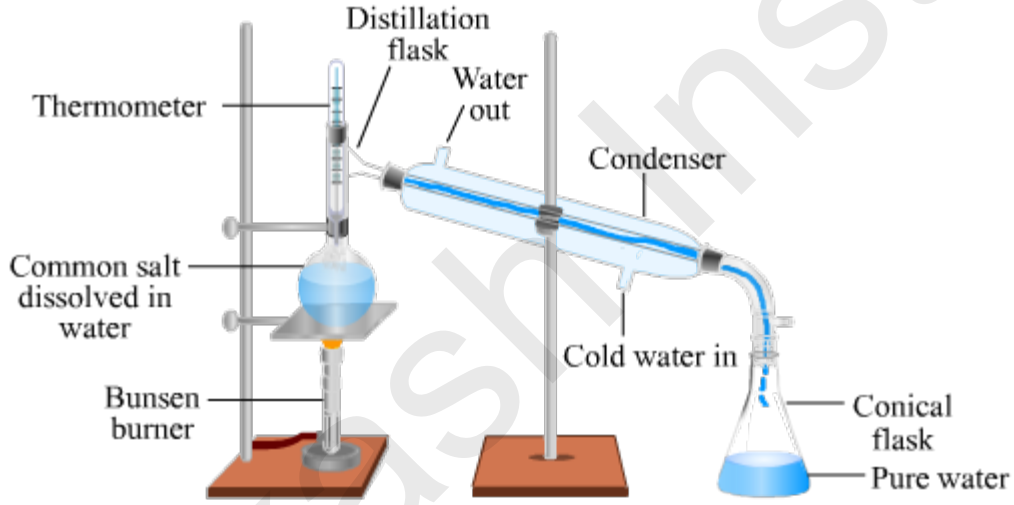


Fig., separation of salt and water using distillation

Question 68:

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:

Various processes are used to purify water on large scale at water works. The source of water for cities is nearby a river or a lake. This water generally contains suspended particles, dissolved impurities and germs. In order to supply this water to homes, it has to be

purified. Following steps are involved to purify water at water works:
(i) In water works, methods like sedimentation, decantation, loading, filtration and chlorination etc., are used to remove undesirable materials from water.
(ii) The source of water supply in a city is either a nearby river or lake (reservoir). From there, it is pumped to a 'sedimentation tank'.
(iii) It is kept here for some time to allow the insoluble substances present in water to settle down at the bottom of the tank.
(iv) It is then sent to a 'loading tank', where some alum is added to water.
(v) Suspended clay particles in water get loaded here with alum particles. After becoming heavy, they settle down at the bottom of the tank. Thus, the process of loading removes the suspended clay particles from water.
(vi) It is then passed through a 'filtration tank' having three layers, i.e., fine sand layer on the top, coarse sand layer in the middle and gravel layer at the bottom .
(vii) These layers act as filters and remove small suspended particles of the water.
(viii) Water is then passed into a chlorination tank. Here, chlorine is added to water to kill the germs present in it.
(ix) Now the clean and disinfected water is pumped to high storage tanks by pumping stations. From these high storage tanks, water is supplied to homes and factories through a network of big and small pipes.

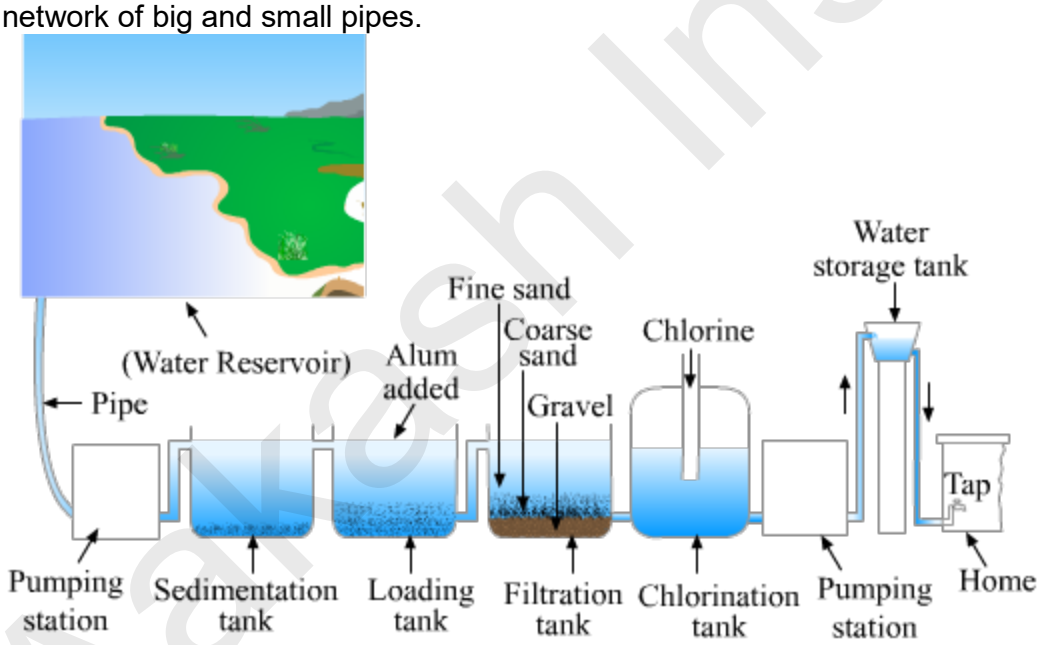


Fig., Water purification process at water works
Chlorine is added to water to kill germs in the drinking water supply.

Question 69:

(a) What is fractional distillation ? What is the use of fractionating column in fractional distillation ?
(b) Draw a labelled diagram of the fractional distillation apparatus used for separating a mixture of alcohol and water.

ANSWER:

(a) Fractional distillation is a process of separating two or more miscible liquids by distillation. The distillate is collected in fractions, which boil at different temperatures. The principle behind this technique is the difference in boiling points of the liquids in the mixture. The fractionating column is fitted in the neck of the distillation flask. Fractionating column provides different temperature zones inside the flask. The highest temperature is at the bottom and the lowest temperature is near its top.

(b)

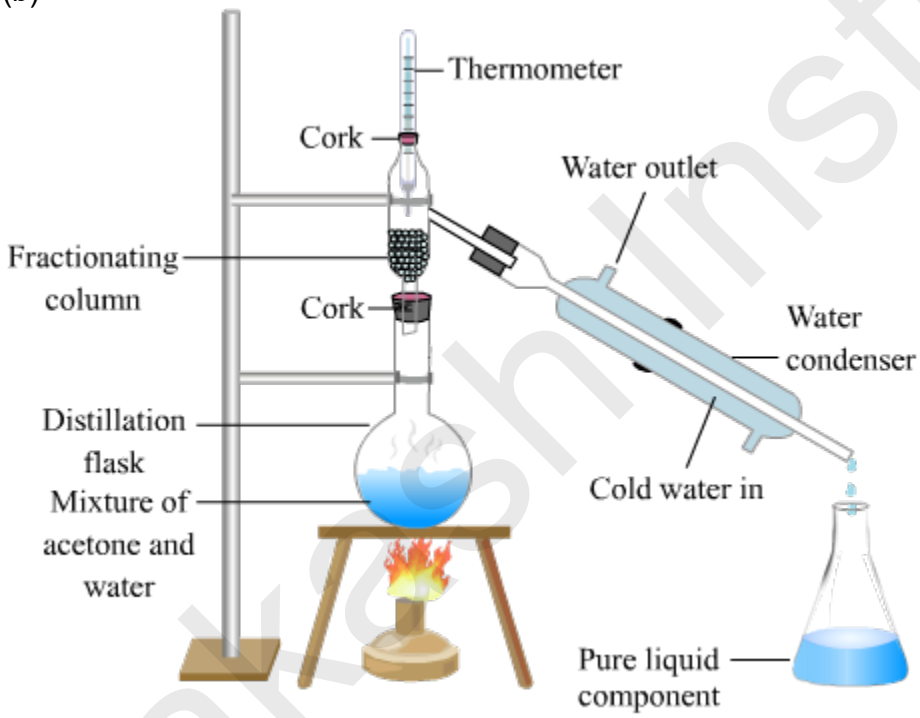


Fig., Separation of mixture of alcohol and water by fractional distillation

Question 70:

(a) Explain how, nitrogen , oxygen and argon gases are separated from air.
(b) Draw a flow diagram of the processes involved in obtaining gases like nitrogen, oxygen and argon from air.

ANSWER:

(a) Nitrogen, oxygen and argon are separated from air by fractional distillation. Following are the steps followed to separate these gases from air:

• Air is first filtered to remove the dust particles, spores etc. Subsequently water vapours and carbon dioxide are removed.

• Air is subjected to high pressure and then cooled. This air is then allowed to expand in a chamber which causes further cooling of the air.

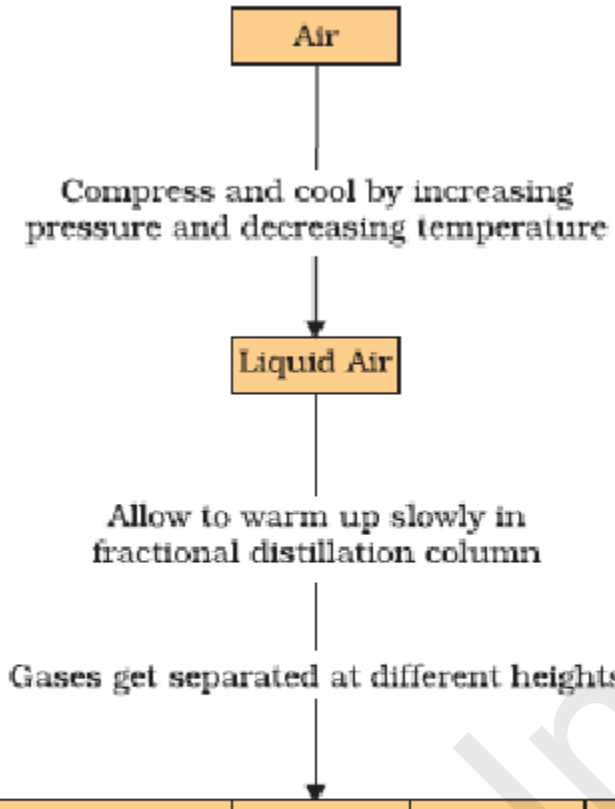
• This process is repeated to cool the air further. Ultimately, the air becomes so cold that it turns into a liquid.

• This liquid air is then fed into a fractionating column from its bottom end and is cooled slowly.

• Liquid nitrogen boils off first to nitrogen gas as the boiling point of nitrogen is lowest at -196°C.

• Liquid argon boils off at a boiling point of -186°C.

• Liquid oxygen boils off last as it has highest boiling point among all three (around -183°C).



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

Fig. Separation of major gases of air

Question 71:

A mixture of milk and groundnut oil can be separated by :
(a) sublimation
(b) evaporation
(c) separating funnel
(d) filtration

ANSWER:

(c) separating funnel
Milk and groundnut oil are two immiscible liquids. So, they can be separated by using a separating funnel.

Question 72:

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:

(c) sand and sulphur

Mixture of sand and sulphur cannot be separated by using water as a solvent because both are insoluble in water.

Question 73:

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:

(d) carbon disulphide

Sulphur is soluble in carbon disulphide but carbon is not.

Question 74:

The dyes present in fountain pen ink can be separated by the technique of :
(a) fractional distillation
(b) infrared photography
(c) crystallisation
(d) chromatography

ANSWER:

(d) chromatography

Chromatography is the technique used to separate the contents of a mixture, where solute particles are in extremely small quantity.

Question 75:

Pure copper sulphate can be obtained from an impure sample by the process of :
(a) evaporation
(b) fractional distillation
(c) centrifugation
(d) crystallisation

ANSWER:

(d) crystallization
Crystallization is the process of cooling a hot concentrated solution of a substance to obtain its crystals in pure form.

Question 76:

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:

(c) chlorine

Chlorine is added to water to purify it from the impurities such as bacteria.

Question 77:

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:

(b) centrifugation

Centrifugation is a process, in which suspended particles are separated from the solvent. In this process, the solution is rotated at a high rate in a centrifuge thereby separating the solute particles and the solvent.

Question 78:

Naphthalene can be separated from sand :
(a) by sublimation
(b) by distillation
(c) by crystallisation
(d) by using water as solvent

ANSWER:

(a) by sublimation

Naphthalene sublimes on heating, whereas sand does not. So, when the mixture is heated, solid naphthalene turns into vapours, which can be condensed. Sand remains in the container.

Question 79:

Which of the following cannot be separated from air by the process of fractional distillation ?
(a) oxygen
(b) argon
(c) hydrogen
(d) nitrogen

ANSWER:

(c) hydrogen

Hydrogen cannot be separated from the mixture of air as it is not present in free state. The three major components of air are nitrogen, oxygen and argon. These are separated using fractional distillation.

Question 80:

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:

(b) nitrogen, argon, oxygen

Boiling point of liquid nitrogen, liquid argon and liquid oxygen are -196°C, -186°C and -183°C respectively. So, nitrogen will boil off first followed by argon and oxygen.

Question 81:

The boiling point of liquid argon is :
(a) – 196°C
(b) – 183°C
(c) –186°C
(d) –193°C

ANSWER:

(c) –186°C

Question 82:

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) crystallisation

ANSWER:

(b) simple distillation

In the mixture of iodine and alcohol, both are miscible. So, distillation process is used to recover both the components.

Question 83:

The best way to recover sugar form an aqueous sugar solution is :
(a) evaporation to dryness
(b) distillation
(c) filtration
(d) crystallisation

ANSWER:

(d) crystallisation

Crystallisation is a better technique to recover sugar from sugar solution because sugar decomposes or gets charred on heating. Also, the soluble impurities get removed by crystallisation.

Question 84:

One of the following does not undergo sublimation. This one is :
(a) camphor
(b) dry ice
(c) silica
(d) iodine

ANSWER:

(c) silica

Silica does not sublime on heating.

Question 85:

Which one of the following scrap metal cannot be separated by magnetic separation ?
(a) nickel
(b) cobalt
(c) chromium
(d) steel

ANSWER:

(c) chromium

Chromium does not have magnetic property. Therefore, it will not be attracted by a magnet.

Question 86:

The liquid air has three components X, Y and Z whose boiling points are : – 186°C, –183°C and –196°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 will be collected from the area near the bottom of the fractional distillation column because it has highest boiling point (−183°C).
(b) Z will be collected from the top part of the fractional distillation column because it has lowest boiling point (−196°C).
(c) X will be collected from the middle part of the fractional distillation column because it has a boiling point −186°C, which is lower than that of Y but higher than that of Z.
(d)X is liquid argon, Y is liquid oxygen, and Z is liquid nitrogen.

Question 87:

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) Liquid A is organic and liquid B is inorganic. When mixed, they form a single layer, i.e., they are miscible liquids. So, we will use fractional distillation to separate the mixture of liquid A and liquid B.
(b) Liquid B is inorganic and liquid C is organic. We will use a separating funnel to separate the mixture of liquid B and liquid C as they form two different layers.
(c)
(i) Liquid A is organic. When liquid A and liquid B are put together in a container, they form a single layer. So, alcohol would behave like liquid A.
(ii) Liquid B is inorganic. So, water would behave like liquid B.
(iii) Liquid C is organic. When liquid B and liquid C are mixed together, they form two separate layers. Oil would behave like liquid C.

Question 88:

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 consists of tiny grains and it is mixed with cement for plastering the walls. So, P is sand. Q is a white solid, which is recovered on a large scale from sea water by the process of evaporation. It is common salt. R is in the form of tiny particles of materials, whose corrosion is called rusting. It is, iron filings. S is ammonium chloride.

(b) At first, let us take the mixture of P, Q, R, and S.
(i) We first separate R (iron filings) by using a magnet to attract them. Then separate S (ammonium chloride) by sublimation.
(ii) Now, we shake P (sand) and Q (common salt) with water. The mixture is then filtered.
(iii) Sand is obtained as residue.
(iv) Now, we will evaporate the filtrate to dryness to obtain Q (common salt).

Question 89:

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 components Y from tincture of iodine ?

ANSWER:

(a) Tincture iodine is a mixture of two materials X and Y. So, X is alcohol.
(b) The material Y has a property and its solid form can be converted directly into vapours on heating by the process called Z. So, Y is iodine.
(c) Process Z is called sublimation.
(d) Process used to recover both the components, i.e., alcohol and iodine, from the tincture of iodine is distillation.
(e) The process used to recover component Y only from the tincture of iodine is evaporation.

Question 90:

The given mixture contains three constituents A, B and C. The constituent A is a yellow coloured, solid element which dissolved in a liquid D. The constituent 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 which is used in cooking 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) Constituent A is yellow coloured solid element. It could be sulphur.
(ii) Sulphur dissolves in liquid D. So, liquid D could be carbon disulphide.

(b) (i) Constituent B is a blue coloured salt, which is insoluble in carbon disulphide but dissolves in water. So, it could be copper sulphate.
(ii) Liquid E could be water as it dissolves copper sulphate.

(c) Liquid C could be vegetable oil as it turns into a solid fat on hydrogenation.

(d) We will separate the mixture containing A, B, and C by following process:

- At first, we filter the mixture of A, B, and C.
- Vegetable oil C, being liquid, will be obtained as a filtrate.
- Residue consists of A (sulphur) and B (copper sulphate).
- We add water to the residue and shake it before filtering. A (sulphur) is obtained as residue.
- Now, we evaporate filtrate to obtain B (copper sulphate).