CLASS IX
GUESS PAPER
SCIENCE

CH. 2. IS MATTER AROUND US PURE

Syllabus :- *Pure substance; Mixture – solution, suspension, colloids; Separation of pure substances from mixtures; Physical and chemical changes; Types of pure substances – elements, compounds.*

Q. 1. Write about a chemically pure substance.
Ans. :- A matter of one kind can not be separated into other kind of matter by any physical method is called a chemically pure substance. It has same quality i.e. colour, texture and taste at a given temperature and pressure.

Q. 2. What can you say about chemically purity of the naturally occurring substance ?
Ans. :- Naturally occurring substances are generally not pure. At least dust particles are mixed with it.

Q. 3. What is the difference in meaning of a pure substance to a common man than to a chemist ?
Ans. :- A substance which is not adulterated is pure for a common man. Milk given by cow or buffalo is pure if no water or other material is mixed with it. But for a chemist milk is not a pure substance. It is a mixture of fats, proteins, calcium and water.

Q. 4. Choose the pure substance from the given materials below :
Butter, banana, blood, ghee, glass, ink, water, paper, sugar, orange, wood, marble.
Ans. ;- Water, sugar.

Q. 5. How the purity of the given substance is tested ?
Ans. :- If a substance has same colour, taste and texture at a given temperature and pressure then it is pure. Also its melting point and boiling point is fixed at a given temperature and pressure.

Q. 6. Why vegetable or fruit is not called a pure substance ?
Ans. :- In vegetables and fruits, various constituents are present in different proportions. It has different colour, taste, and texture. Hence it is not called a pure substance.

Q. 7. What is a mixture ?
Ans. :- Two or more substances mixed in any proportion without any chemical combination and whose constituents can be separated by physical process is called a mixture. Sea water is a mixture of water and dissolved salts. They can be separated by evaporation.

Q. 8. How a mixture is classified on the basis of their physical properties ?
Ans. :- On the basis of physical properties, mixture is classified as : (i) Homogeneous mixture and (ii) Heterogeneous mixture.

(i) Homogeneous mixture :- There is no visible boundaries between the components of homogeneous mixture. Its composition is uniform throughout its mass. For example – mixture of sugar and water. We can not see any boundary between water and sugar. Other examples are mixture of water and alcohol, alloy like brass, german silver etc.

(ii) Heterogeneous mixture :- Boundaries of homogeneous mixture are visible. It does not have uniform composition throughout its mass. For example :- mixture of sand and cement, water and kerosene.

Q. 9. State different types of homogeneous and heterogeneous mixture with examples.
Ans. : - (i) Heterogeneous mixtures :-
(a) Solid solution : - Alloys – brass, steel, bronze, German silver etc.
(b) Liquid solution : - sea water, sugar solution, cane sugar juice etc.
(c) Gaseous solution : - air, natural gas, petroleum gas etc.
(ii) Heterogeneous mixtures : -
(a) Solid + Solid : - Sand and stone chips, sugar and sand etc.
(b) Solid + Liquid : - Tooth paste, suspension, colloidal solution etc.
(c) Solid + Gas : - Smoke, dusty storm etc.
(d) Liquid + Liquid : - Milk, dilute acids, emulsion etc.
(e) Liquid + Gas :- Soap bubbles.

Q. 10. How will you select the compound (a pure substance) from given two samples of liquids, one of which is a mixture and the other is a compound ?
Ans. : - The liquid which boils at a constant temperature throughout the heating is a compound or a pure substance. The liquid which boils at two different temperatures is a mixture.

Q. 11. Iron filing and sulphur are mixed and heated. The following observations are done:
(i) No iron gets attracted to a magnet.
(ii) When treated with dilute sulphuric acid, a foul smelling gas is released.
State with reasons whether the resulting substance is a mixture or a compound.
Ans. : - The resulting substance is a compound as the constituents substance (particles) differ from resulting substance.

Q. 12. Give evidence in support of your answer that air is a mixture not a compound.
Ans. : - Air is a homogeneous mixture of several gases that can be established as :
(i) Amount of gases in air differ marginally at different places.
(ii) No definite formula of air can be given.
(iii) Gases present in air can be separated by fractional distillation of liquid air.
(iv) The properties of constituents of air is present. Air (oxygen) supports combustion and air (carbon dioxide) turns lime water milky.

Q. 13. Differentiate between pure substance (compound) and mixture.
Ans. :-

Pure substance (compound)	Mixture
(1) Elements are present in a definite proportion by weight.	(1) Constituents are present in any ratio.
(2) It is always homogeneous.	(2) It may be homogeneous (solution) or heterogeneous.
(3) It has different properties than its constituents.	(3) It has an average properties of its constituents.
(4) The constituents can not be separated by simple separation method.	(4) Its constituents can be separated by simple separation method.
(5) Energy in the form of heat, light is evolved or absorbed.	(5) There is generally no change in energy.
(6) At constant temperature and pressure there is either no change or large change in volume in its formation.	(6) At constant temperature and pressure there is either no change or very little change in volume in its formation.

Q. 14. 0.25 g and 0.50g respectively of potassium permanganate are added into two buckets each containing 5 litres of water. The composition of these two mixtures are different. Can we say that these mixtures are homogeneous ?
Ans. :- The above two mixtures are homogeneous although their composition are different.

Q. 15. What is meant by a pure substance ?
Ans. :- A pure substance contains a single type of particles which can not be separated into other kind of matter by any physical means.

Q. 16. List the points of differences between homogeneous and heterogeneous mixtures.
Ans. :-

Homogeneous Mixture	Heterogeneous Mixture

(1) It does not have any visible boundaries of separation between its constituents.	(1) It has a visible boundaries of separation between its constituents.
(2) Its composition is uniform.	(2) Its composition is not uniform.
Examples :- Alloys, Sea water, Air.	Examples :- Paste, Smoke, Milk.

Q. 17. How are solution, colloidal solution and suspension different from each other ?
Ans. :-

Solution	Colloidal Solution	Suspension
(1) It is homogeneous and transparent.	(1) It is heterogeneous and translucent.	(1)It is heterogeneous and opaque.
(2) Size of particles are less than 1 nm.	(2) Size of particles are between 1nm to 100 nm.	(2) Size of particles is greater than 100 nm.
(3) Particles are not visible even with a powerful microscope	(3) Particles are seen with a high power microscope.	(3) Particles are seen with naked eye.
(4) It is stable.	(4) It is stable.	(4) It is unstable.
(5) Particles diffuses rapidly.	(5) Particles diffuses slowly.	(5) Particles do not diffuse.
Example :- Sea water.	Example :- Blood.	Example :- Mud water.

Q. 18.A sample of mixture is given. How is it tested that whether the sample is a colloidal solution or suspension ?
Ans. :- (i) On adding a salt to the mixture, if particles settle down, it is a colloid.
(ii) If the solution is heterogeneous and particles settle on keeping for some time, it is a suspension.

Q. 19. Define colloids. Write their characteristics.
Ans. :- A solution in which size of the particles of the solute (dispersed phase) lie between 1 nm to 100 nm, the solution is called colloid.
The characteristics of a colloid :-
(i) Brownian movement :- Particles move randomly in a zig-zag path like a gas particle.
(ii) Tyndal effect :- Path of light passing through a colloidal solution is visible in dark.
(iii) Electrophoresis :- When electric current is passed through a colloidal solution, the particles move towards either electrodes.

Q. 20. The solubility of a substance is 90.5g/100g in water at 25ºC. A solution of the same is made by taking 1 kg of it in 2 litres of water. What is the nature of the solution ?
Ans. :- The solution is unsaturated as 1000g/2000g is less than 90.5g/100g i.e. its solubility.

Q. 21. What happens when :

(i) Light is passed through a colloidal solution.
(ii) Electric current is passed through a colloidal solution.
Ans. :- (i) Path of the light is visible on passing beam of light through a colloid.
(ii) Particles of colloid move towards one electrode on passing electric current through it.

Q. 22. Some mixtures are given below. Arrange them according to solutions, colloids and suspensions :
Lime water, milk, mud water, aerated water, writing ink, sand water, sugar in water, blood, common salt in benzene, gold ornaments, jellies, wheat flour in water, vinegar, butter, lemonade, aluminium paint, coke, mist.
Ans. :-
True solution :- lime water, aerated water, sugar in water, gold ornaments, vinegar, lemonade, coke.
Colloids :- milk, writing ink, blood, jellies, butter, aluminium paint, mist.
Suspension :- mud water, sand water, common salt in benzene, wheat flour in water.

Q. 23. Differentiate between true solution and colloidal solution on the basis of the particle size.
Ans. :- True solution is a homogeneous mixture. Colloidal solution appears to be homogeneous but actually it is heterogeneous. The size of particles of solution is less than 1 nm and the size of particles of colloid lie between 1nm to 100nm. For example sea water is a true solution and milk is a colloidal solution.

Q. 24. Rain water deposited in a ditch contains :
Air bubbles, salt, calcium bicarbonate, sand grains, stone pieces and clay.
Write which of them is a solvent, solution, suspension or colloid.
Ans. :-
Solvent :- water
Solution :- salt solution
Suspension :- sand grains
Colloid :- clay particles.

Q. 25. List the following colloids on the basis of type of dispersing medium by writing the nature of dispersed phase :
Fog, smoke, shaving cream, milk, mud, foam, jelly, coloured gemstone, clouds, automobile exhaust, face cream, milk of magnesia, rubber, chese, milky glass, mist, sponge, butter, pumice, paint, writing ink, blood.
Ans. :-

Dispersed Phase	Dispersing medium	Type	Colloids
Liquid	Gas	Aerosol	fog, cloud, mist
Solid	Gas	Aerosol	smoke, automobile exhaust
Gas	Liquid	Foam	shaving cream
Liquid	Liquid	Emulsion	milk, face cream, ink, blood, paint
Solid	Liquid	Sol	milk of magnesia, mud

Gas	!	Solid	!	Foam	! foam, rubber, sponge, pumice
Liquid	!	Solid	!	Gel	! jelly, cheese, butter
Solid	!	Solid	!	Solid Sol!	Coloured gemstone

Q. 26. Write the use of a solution, a colloid and a suspension in our daily life with example.
Ans. :-

Use of a solution :- When two reacting solid substances are mixed, they do not react or react very slow. When their solutions are mixed they react very fast. In a solution, substances react in a molecular level. For example dry washing powder can not clean clothes. If its solution is taken it cleans easily.

Use of a colloid :- In pharmaceuticals, insoluble substances become more effective if it is used as a colloidal form. Medicines are insoluble in water but it is used in the form of a colloid.

Use of a suspension :- There are many substances which are insoluble or sparingly soluble in dispersing medium but are useful for analytical purposes when dispersed temporarily. For example, barium sulphate dispersed in water is used for diagnostic X-rays.

Q. 27. Give properties of a solution, a colloid and a suspension.
Ans. :-
Properties of a solution :- (i) It is a homogeneous mixture.
(ii) Diameter of particles of a solution are smaller than 1 nm.
(iii) Particles are not visible to naked eye.
(iv) Path of light through solution is not visible.
(v) Its constituents can not be separated by sedimentation or even filtration.
Properties of a colloid :- (i) It is a heterogeneous mixture.
(ii) Diameter of particles of a colloid lie between 1 nm to 100 nm.
(iii) Particles are not visible to naked eye.
(iv) Path of light through colloid is visible.
(v) Its constituents can not be separated by sedimentation or filtration.
Properties of a suspension :- (i) It is a heterogeneous mixture.
(ii) Diameter of particles of a suspension are bigger than 100 nm.
(iii) Particles are visible to naked eye.
(iv) Path of light through suspension is visible.
(v) Its constituents can be separated by filtration.

Q. 28. A mixture is homogeneous and path of light is not visible through it. What can you say about the nature of the mixture and size of the particles.
Ans. :- The mixture is a solution and diameter of the particles are smaller than 1 nm.
Q. 29. The diameter of particles of a mixture are 40 nm to 50 nm. How can we separate the constituents of the mixture ?

Ans. :- The mixture is a colloid and its constituents can be separated by centrifugation.

Q. 30. How can you say that a given heterogeneous mixture is a solution, a colloid or a suspension.
Ans. :- A solution must be a homogeneous mixture. If the mixture is left undisturbed for some time and no solid settle down then it is a colloid, otherwise a suspension.

Q. 31. Why does a beam of sunlight illuminated when it enters a room through a small hole ?
Ans. :- Light beams are scattered by moving dust particles in the room.

Q. 32. State the Tyndall effect. Tyndall effect is observed when sunlight passes through dense forest. Why ?
Ans. :- The illumination of beam of light due to scattering on collision with certain particles is called Tyndall effect.

In dense forest in the morning there is fog which scatter the beam of sunlight. Hence the phenomena.

Q. 33. To make a saturated solution, 36 g of sodium chloride is dissolved in 100 g of water at 293 K. Find its concentration at this temperature.
Ans. :-

Mass of sodium chloride = 36 g
Mass of water = 100 g
Mass of solution = 100 g + 36 g = 136 g
Concentration of solution = (36/136) × 100
= 26.47 %.

Q.34. A solution contains 40 g of common salt in 320 g of water. Calculate the concentration in terms of mass by mass percentage of the solution.
Ans. :-

Mass of solute (salt) = 40 g
Mass of solvent (water) = 320 g

We know,

Mass of solution = Mass of solute + Mass of solvent
= 40 g + 320 g
= 360 g
Mass percentage of solution = (mass of solute/Mass of solution) × 100
= (40/360) × 100
= 11.1 %.

Q. 35. Define :
(i) True solution (ii) Solute (iii) Solvent (iv) Solubility.
Ans. :- (i) True solution :- A homogeneous mixture of two or more substances is called a true solution. For example – sea water.

(ii) Solute :- The substance which is present in a smaller proportion in a solution is called solute. For example – salt in sea water.

(iii) Solvent :- The substance which is present in larger proportion in a solution is called a solvent. For example – water in sea water.

(iv) Solubility :- At a given temperature, the maximum amount of solute that can be dissolved in a given amount of solvent is called solubility at that temperature.

Q. 36. Distinguish between saturated and unsaturated solution.
Ans. :- Saturated solution :- A solution in which no more solute can be dissolved at a given temperature is called saturated solution.

Unsaturated solution :- A solution in which more solute can be dissolved at a given temperature is called unsaturated solution.

Q. 37. How saturated solution of common salt is prepared at 40ºC ? What will happen on cooling the solution ?
Ans. :- In a beaker50 ml of water is taken and it is heated up to 40ºC. Common salt is added slowly and stirred with a glass rod till some salt remains un-dissolved. The solution is quickly filtered. The filtrate thus obtained is a saturated solution of common salt at 40ºC.

When solution is allowed to cool, the solubility will decrease and salt will start settling at the bottom of the beaker.

Q. 38. How will you show that a given solution is saturated or unsaturated at a given temperature ? What happens when a hot saturated solution of a substance is allowed to cool ?
Ans. :- A small amount of substance is added to the solution. If the substance dissolves and clear solution is obtained, the given solution is unsaturated, otherwise it is saturated.

When a hot saturated solution of a substance is cooled, some substance reappears and settle on the bottom of the container.

Q. 39. A ray of light passing through a solution is not visible. Why ?
Ans. :- The diameter of particles of a solution is smaller than 10^{-9}m. It is too small to scatter a light. Hence the path of light is not visible.
Q. 40. What happens when a saturated solution of a substance at a given temperature is allowed to cool ?
Ans. :- A saturated solution at a given temperature contains the maximum amount of solute that can be dissolved at this temperature. On cooling, the solubility decreases, the solute starts reappearing.
Q. 41. Why alloy is considered a homogeneous although its constituents can not be separated by physical methods ?
Ans. :- Alloy is considered a homogeneous mixture as :
(i) its constituents are uniformly distributed throughout its mass,
(ii) the properties of constituents are exhibited,
(iii) composition is variable of its constituents.

Q. 42. Why water is called a universal solvent ?
Ans. :- Water is called a universal solvent due to :
(i) polar nature of its molecules,
(ii) it can dissolve a large number of substances in it.

Q. 43. Why a saturated solution becomes unsaturated on heating ?
Ans. :- On heating solubility of a substance increases. More solute can be dissolved at a higher temperature. Hence on heating, a saturated solution becomes unsaturated on heating.

Q. 44. What is difference between aqueous and non-aqueous solutions ?
Ans. :- True solutions which is obtained in water are called aqueous solution, e.g. vinegar. True solutions which is obtained in other solvent are called non-aqueous solution, e.g. amino acids dissolved in acetone.

Q. 45. How the concentration of a solution is expressed ?
Ans. :- Concentration of a solution is expressed in terms of percentage by mass of solute per 100 gram of the solution.

$$\% \text{ solute} = (\text{mass of solute/mass of solution}) \times 100$$

Thus, a 5% solution means 5 gram of solute is dissolved in 100 gram of solution, i.e. it contains 5 gram solute and 95 gram solvent.

The concentration of a solution is also expressed as mass of solute dissolved in 100 cm^3 of solution. Thus 5% solution by volume means 5 gram solute is dissolved in 100 cm^3 of solution.

Q. 46. 25 g of common salt is dissolved in 100 g of water. Calculate the percentage composition of the solution.
Ans. :-

Mass of solute = 25 g
Mass of solution = 100 g + 25 g = 125 g
% composition = (25 g/ 125 g) × 100 %
= 20 % mass by mass.

Q. 47. 20 g of sugar is dissolved in 125 ml of water. Calculate the concentration of the solution in terms of mass by volume percentage of solution.
Ans. :-

Mass of sugar = 20 g
Volume of water = 125 ml
Mass by volume percentage of solution = (20/125) × 100 %
= 16 %.

Q. 48. Define suspension.

Ans. :- A heterogeneous mixture of a insoluble solid of small particles in a liquid visible to the naked eye and the solid settle down to the bottom under the effect of gravity if left undisturbed for some time is called suspension. The size of the particles are bigger than 100 nm. Mud water is an example of suspension.

Q.49. Define colloidal solution. Give examples also.
Ans.:- A heterogeneous translucent stable solution whose particles are of diameter 1 nm to 100 nm and is visible under high powerful microscope is called colloidal solution. For example :- blood, milk, fog, etc.

Q. 50. Define dispersing medium and dispersed phase.
Ans.:- Dispersing Medium :- The component of colloidal solution in which the colloidal particles are suspended is known as dispersing medium.
Dispersed Phase :- The colloidal particles is called dispersed phase.
Q. 51. What is purpose of separation of components of mixture ?
Ans. :- Separation of components of mixture is done to :-
(i) remove undesirable components like stones from grains.
(ii) remove harmful components like insects from grains and water.
(iii) get pure sample of substance.
(iv) get useful components like butter from milk or sugar from sugarcane.
Q.52. State the principle of separation of a mixture.
Ans.:- The constituents of a mixture have different physical and chemical properties. Hence depending upon the respective properties of a constituent, we use different techniques for their separation.
Q.53. Name the commonly used techniques by farmers to purify food grains in the village.
Ans.:- The techniques generally used by farmers are :-
(i) Winnowing :- Lighter husks are separated from the grains with the help of blowing/moving air.
(ii)Hand-picking :- Undesirable components like small pieces of stones husk, grains from wheat, rice and pulses are separated.
(iii) Sieving :- In this process, different sizes of grains are separated allowing them to pass through different sizes of holes of the sieve.

Q. 54. State the physical process used in laboratories or industries to separate mixtures.
Ans.:- (i) Evaporation :- the process to remove water from solution by heating in sun or on fire.
(ii) Sedimentation :- Mixture is left for some time and heavy particles are settle down. The clear liquid is poured down.
(iii) Filtration :- Solid particles are separated from liquid by allowing to pass through filter paper.
(iv) Crystallization :- Crystals of pure substance is obtained from its solution by boiling the solution and allowing to cool slowly.
(v) Sublimation :- A solid substance is separated from mixture of solids by heating the mixture and allowing the vapour to condense into solid directly.
(vi) Distillation :- One liquid is separated from the mixture by converting it into vapour and then condensing it.

(vii) Centrifugation :- In this process lighter suspended particles in a liquid are removed by rotating the mixture at a higher speed.
(viii) Magnetic Separation :- In this process magnetic substance is separated from the mixture with the help of a magnet.

Q. 55. Write examples of solutions having a volatile component and non-volatile component.
Ans.:- (i) Sea water.
Volatile component :- Water.
Non-volatile component :- Salt.
(ii) Ink Solution.
Volatile component :- Water.
Non-volatile component :- Ink.

Q. 56. How a non-volatile component from a solution is obtained ?
Ans.:- A china dish is placed on the mouth of a beaker half filled with water. Some drops of solution is taken on the china dish. The beaker is heated till the solution in the china dish dries up. The volatile component i.e. water is evaporated leaving non-volatile component in the dish.

Q. 57. State the importance of evaporation. Write where this technique is used on a large scale.
Ans.:- Evaporation is used to separate dissolved solid in liquid, mainly water. This technique is used on a large scale to prepare salt from sea water. Sea water is left in the sun for some days. Water dries up leaving behind salt.

Q.58. What is filtration ? Write the process of filtration.
Ans.:- Filtration :- Process of separating insoluble components of a mixture from liquid is called filtration.
Process of filtration :- Filter paper is kept on a funnel clamped on a stand. A beaker is placed under the funnel. The mixture of insoluble solid and liquid is poured on the filter paper with the help of a solid glass rod. The insoluble substance is retained on the filter paper and liquid passes through it and is collected in the beaker placed under funnel.

Q.59. Define centrifugation. Write its process.
Ans.:- Centrifugation :- The process of separating lighter suspended particles from liquid by rotating the mixture at a very high speed is called centrifugation.
Process of centrifugation :- The mixture is taken in a closed container and rotated at a very high speed. The suspended heavy particles are settled at the bottom and lighter particles remain behind. When milk is churned, after 2 to 3 minutes, creams is collected and being lighter than milk floats at the upper surface.

Q. 60. State some applications of centrifugation.
Ans.:- Centrifugation is used in :-

(i) home and dairies to obtain cream from milk or butter from cream.
(ii) washing machine to squeeze out water from wet clothes.
(iii) laboratories to separate colloids.
(iv) in diagnostic centre to test blood and urine.

Q. 61. What is separating funnel ? Write its different uses.
Ans.:- Separating funnel :- It is a funnel fitted with a stop cock at the bottom. It is used to separate two immiscible liquids.

Use of separating funnel :- A mixture of mustard oil and water is taken in a separating funnel clamped with a stand. A beaker is placed under the funnel. The funnel is left for some time. Oil floats on the upper surface of water and after some time separate layers of oil and water is formed. The liquid forming lower level is removed through stopcock.

Q. 62. What is sublimation ? Describe the process used to separate the common salt and ammonium chloride from their mixture.
Ans.:- Sublimation :- A solid substance on heating is converted to vapour directly without converting into liquid and on cooling directly from vapour to solid. This phenomenon is called sublimation. Ammonium chloride, camphor or iodine on heating is converted directly to vapour and on cooling directly from vapour to solid.

Process :- The mixture of common salt and ammonium chloride is taken in a china dish and covered with a funnel. The opening of the funnel is covered with cotton wool. When the dish is heated, ammonium chloride is evaporates and condense on the wall of the funnel in the crystal form leaving behind common salt in the china dish.

Q. 63. What is distillation ? Explain the process.
Ans.:- Distillation :- The process to separate two miscible liquids whose boiling points differ by 20ºC or more. It is also used to purify the impure liquids.

Process :- Impure liquid or a mixture of two miscible liquids whose boiling point differ more than 20ºC is taken in a round bottom flask fitted with a condenser. The other end of the condenser is kept inside a flask as a receiver. The flask is clamped and heated. Liquid starts boiling and vapour rises up and passes through the condenser. Here the vapour is condensed to liquid and is collected in the receiver. The other liquid whose boiling point is more is left in the flask.

Q. 64. Write the type of mixture that can be separated by distillation.
Ans.:- Simple distillation is used to separate mixture :
(i) Containing soluble solid in a liquid.
(ii) containing two miscible liquids that boils without decomposition and have sufficient difference in their boiling points.

Q. 65. How a mixture of ethyl alcohol (boiling point 78ºC) and water (boiling point 100ºC) is separated. Write the process with diagram.
Ans.:- As alcohol and water are miscible and difference in their boiling points is 22ºC. So, these can be separated by simple distillation process.

Process:- The mixture of ethyl alcohol and water is taken in a distillation flask and heated the temperature starts rising. When liquid starts boiling and temperature is fixed at 78ºC, vapour of alcohol is formed and passes through the condenser to be collected in the receiver. The temperature remain fixed till all the alcohol is evaporated. When temperature starts raising heating is stopped and pure water is collected from the flask.

Q. 66. How will you separate a mixture containing kerosene and petrol (difference in their boiling points is more than 25ºC), which are miscible with each other ?
Ans.:- The difference in the boiling points of petrol and kerosene is sufficiently large and they do not decomposes on heating, these can be separated by simple distillation process.

Process :- The mixture of petrol and kerosene is taken in a distillation flask and heated. The temperature starts rising and when liquid starts boiling and temperature remain fixed. Petrol starts evaporating and is collected in the receiver. When temperature starts raising, the heating is stopped. Kerosene left in the flask is collected.

Q. 67. A mixture of toluene and acetone is distilled in a distillation flask and it is found that the temperature becomes constant at 56ºC for some time the residual liquid left is toluene. On continuing the heating, temperature becomes constant at 80ºC. Now answer the following questions :
(i) Write the boiling points of acetone and toluene.
(ii) Why is it possible to separate acetone from toluene ?
(iii) Temperature remains constant at 56ºC even though heating is continued. Why ?
Ans.:- (i) Boiling point of acetone is 56ºC. Boiling point of toluene is 80ºC.
(ii) As, acetone and toluene do not decompose on heating and the difference in their boiling point is sufficiently large.
(iii) Temperature remains constant because heat given is converted into latent heat of vaporization of acetone.

Q. 68. State the advantage of distillation over evaporation.
Ans.:- In distillation liquid is recovered and liquid is lost in evaporation.

Q. 69. Define chromatography. Write its uses.
Ans.:- Chromatography :- The technique in which different soluble components of a mixture are separated due to their differential movement in solvent i.e. the substance which is more soluble in a liquid moves faster.

Use of chromatography :- It is used to separate :
(i) components of dyes, (ii) amino acids, (iii) pigments from natural colour, (iv) sugars from urine, (v) drugs from blood.

Q.70. What is blue/black ink ?
Ans.:- Blue/black ink is a solution of dye; a mixture of two or more coloured components.

Q. 71. How will you show that the dye used in blue/black ink is a mixture of two or more components.
Ans.:- A thin strip of filter paper is taken and a line with pencil is drawn approximately 3 cm above the lower edge. A small drop of water soluble ink is dropped at the centre of the line and left to dry. The filter paper is then lowered into a jar containing water in such a way that the drop of ink is just above the water level and left undisturbed for some time. The coloured component that is more soluble in water, rises faster and in this way the colours get separated.

Q. 72. State the important criteria to use chromatography for separating components of a mixture.
Ans.:- It is used to separate components of a mixture if the components are completely soluble in the same solvent or a mixture of solvents.

Q. 73. What is a fractional column ? What is advantage of it ?
Ans.:- Fractional column :- it is a long tube provided with obstructions or packed with glass beads. These obstructions slows down the movement of vapours upwards and that of the liquids downwards.
Advantage :- the fractional column is used to separate components of mixture of two miscible liquids, the difference in their boiling points is very less i.e. 20ºC to 25ºC.

Q.74. State important industrial applications of fractional distillation.
Ans.:- Its application in industries are in the :
(i) separation of petroleum products and (ii) separation of gases from air.

Q.75. A mixture of liquid ‘A’ with boiling point 80ºCand other ‘B’ with boiling point 90ºCis given. How will they be separated ?
Ans.:- The mixture will be taken in a fractionating flask fitted with fractionating column. On heating, the mixture boils and vapour will contain more of ‘A’ and less of ‘B’. When vapour rises in the fractionating column, they will condense partially and the condensed liquid will flow down. Vapour of ‘B’ whose boiling point is higher will condense more rapidly than that of ‘A’. The vapour moving up will be richer in ‘A’. The condensed liquid flowing down meets the ascending vapours and will be rich in liquid ‘B’. The process is repeated throughout the length of the fractionating column. The vapour which will left the fractionating column through top of it will contain liquid ‘A’ and will be collected in the condenser. The liquid left behind will be rich in ‘B’ and is obtained by simple distillation.

Q. 76. How the constituents of air is separated ?

Ans.:- Air is converted to liquid form under high pressure and low temperature. After that at constant high pressure, the liquid air is warmed slowly in fractionating column. Different fractions of air is obtained at different temperatures in a gaseous form. The gas with lowest boiling point is obtained first.

Q. 77. Boiling points of oxygen, argon and nitrogen are – 182ºC, - 186ºC and – 196ºC respectively. Answer the following questions :
(i) arrange the gases in descending value of their boiling points.
(ii) which gas condenses first when air is cooled ?
(iii) when liquid air is boiled, which gas is obtained first ?
Ans.:- (i) Oxygen > Argon > Nitrogen.
(ii) Oxygen (ii) Nitrogen.

Q. 78. Diesel oil, kerosene, petrol and petroleum ether are fractions of a cruide oil. Their boiling points ranges as 525 – 670 K, 453 – 550 K, 343 – 473 Kand 303 – 363 Krespectively. When the cruide oil is heated, arrange the fractions in the order collected in the distillate.
Ans.:- Petroleum ether, petrol, kerosene, diesel oil.

Q. 79. What type of mixtures are separated by the technique of crystallization ?
Ans.:- Crystallization is used to :
(i) purify salt obtained from sea water.
(ii) obtain pure substance from an impure sample.

Q. 80. How will you obtain pure solid substance from its impure sample ? Write the process taking alum as an example.
Ans.:- To purify a solid from its impurities, the process of crystallization is used.
Process :- 5 g of sample of impure alum is dissolved and concentrated solution is prepared. The mixture is filtered. The filtrate is heated in a china dish. When some solid starts appearing, the dish is covered with a filter paper and left to cool undisturbed for a day. The crystals of pure alum is separated by filtration or decantation.

Q. 81. State the advantages and disadvantages of crystallization over evaporation.
Ans.:- Advantages of Crystallization :-
(i) Fine crystals are obtained. (ii) The substance which decomposes on heating are safely purified.
Disadvantages of Crystallization :-
(i) Some substance remains in the mother liquor.
(ii) Liquid needs purification for further use.

Q. 82. What is decantation ? Write the process of decantation.

Ans.:- Decantation :- The process of separating insoluble solid from liquid is called decantation.

Process :- Rain water contains suspended solid particles. It is taken in a beaker and left undisturbed for some time till clear liquid (water) appears and suspended solid particles are collected at the bottom. Clear liquid is transferred to other container without disturbing the settled particles.

Q. 83. Write the method of separation of camphor from sodium chloride.
Ans.:- Camphor can be separated from sodium chloride by :
(i) Sublimation :- The mixture is heated in a china dish covered with an inverted funnel. The other end of the funnel is closed with cotton wool. Camphor sublimes and its vapour is condensed on the inner wall of the funnel. Sodium chloride is left behind in the china dish.
(ii) Filtration :- When mixture is dissolved in water, camphor remains as residue. It is filtered. Camphor remains on the filter paper. It is collected, washed and dried. Sodium chloride is obtained by heating the filtrate and evaporating the water.

Q. 84. How a mixture of sand, water, and mustard oil is separated ?
Ans. :- The mixture is taken in a beaker and allowed to settle for some time. The heavy sand particle settle down on the bottom of the container. The liquid is decanted to another beaker and sand remains in the first beaker.

The mixture of water and oil is taken in a separating funnel and left undisturbed till oil and water form separate layer. Water is transferred to a beaker by opening the tap of the separating funnel. Oil is transferred to another beaker.

Q. 85. Name the technique to separate :
(i)Butter from curd. (ii) Camphor from salt. (iii) Fine insoluble particles suspended in liquid. (iv) A solid dissolved in a liquid. (v) A sublimable solid mixed with other solid. (vi) Salt from sea water. (vii) Three solid substances soluble in a mixture of solvent. (viii) Two immiscible liquids. (ix) Two miscible liquids having a difference of 10ºC in their boiling points. (x) Mixture of helium and nitrogen gas.
Ans.:- (i) Centrifugation. (ii) Sublimation. (iii) Sedimentation and decantation. (iv) Evaporation or Distillation or Crystallization. (v) Sublimation. (vi) Evaporation or Crystallization. (vii) Chromatography. (viii) Separating Funnel. (ix) Fractional Distillation. (x) Cooling and Fractional Distillation.

Q.86. Define chromatography. State its advantages over other methods of separation.
Ans.:- Chromatography :- The process of separation of components of a mixture by adsorbing them over a suitable material is called Chromatography.

Advantages of Chromatography :-
(i) It is used even if the mixture is very small in amount.
(ii) The components of mixture is not wasted.
(iii) Apart from the separation, the constituents of the mixture can be identified.

Q. 87. State the principle of chromatography. Name different types of chromatography commonly used.
Ans.:- It is based on the distribution of the mixture of the components between a stationary phase and moving phase. The more soluble components move faster.

Name of different chromatographic techniques :

(i) Column chromatography.
(ii) Thin layer chromatography.
(iii) Paper chromatography.

Q. 88. Define physical change and chemical change.
Ans.:- Physical change :- A change in which the composition and chemical nature of a substance does not change but its state or physical properties are changed is called physical change. For example :- water to steam, water to ice.

Chemical change :- A permanent change in which physical properties as well as chemical properties are changed is called chemical change. For example :- rusting of iron, burning of wood.

Q. 89. Give reason for the following :
(i) Ripening of a fruit is a chemical change.
(ii) Crystallization is a physical change.
(iii) Formation of curd from milk is a chemical change.
(iv) Separation of gases from air is a physical change.
Ans.:- (i) The initial properties and composition is completely changed. The process can not be reversed. So, it is a chemical change.
(ii) As there is no change in chemical properties and composition, it is a physical change.
(iii) Curd and milk are entirely different substance and we can not change curd to milk. Hence it is a chemical change.
(iv) Separated gas can be mixed again. The properties of gases remains same before and after separation. Hence it is a chemical change.

Q. 90. Which of the following is a physical change ? Explain with reason.
(i) Hydrogen and oxygen are formed on passing electric current through water.
(ii) A bulb glows on passing an electric current through it.
Ans.:- (i) Physical as well as chemical properties are changed . Hence it is a chemical change.
(ii) When current is stopped bulb does not glow. Hence it is a physical change.

Q. 91. Explain with reason that burning of oil is a chemical change.
Ans.:- When oil is burnt, it react with oxygen and new substance is formed. Hence it is a chemical change.

Q.92. Explain how change in energy takes place in both physical and chemical change.

Ans.:- Burning of a candle is a chemical change and energy is evolved in it. Evaporation is a physical change and energy is absorbed in it.

Q.93. Distinguish between physical and chemical change.
Ans.:-

Physical Change	Chemical Change
(1) Only properties of substance is changed. e.g. colour, physical state, density etc.	(1) New chemical substance is formed as a result of chemical change.
(2) Change is temporary.	(2) Change is permanent.
(3) Original substance can be easily recovered.	(3) Original substance can not be recovered easily.
(4) Chemical property of the substance does not change.	(4) Chemical property of the substance is changed and new substance is formed.

Q. 94. Write some examples of physical change and some examples of chemical change.
Ans.:- Examples of physical change :- (i) melting of wax, (ii) breaking of cup, (iii) cutting fruits, (iv) glowing of bulb on passing electric current, etc.

Examples of chemical change :- (i) burning of wood, (ii) cooking of food, (iii) rusting of iron, (iv) burning of candle, (v) digestion of food, etc.

Q. 95. Classify as a physical or chemical change, the following :
(i) Cutting of rod, (ii) melting of coconut oil, (iii) rusting of iron, (iv) turning steam from water, (v) breaking of water into hydrogen and oxygen, (vi) diluting acid.
Ans.:- Physical change :- cutting of rod, melting of coconut oil, turning of steam from water, diluting acid.
Chemical change :- rusting of iron, breaking of water into hydrogen and oxygen.

Q.96. Give examples of some physical change and explain it.
Ans.:- (i) Melting of wax. :- It is a physical change . On heating solid wax changes to liquid and on cooling liquid wax changes to solid.
(ii) Glowing of electric bulb. :- It is a physical change. When current is passed through bulb, it glows and when flowing of current is stopped, bulb does not glow and there is no change in filament.
(iii) Dissolving salt in water. :- When salt is added in water, it is dissolved. On heating the solution, water evaporates and we get solid salt as a residue. Its properties are not changed.
(iv) Mixing of sand in iron filings. :- The properties of constituents do not change if we separate them using magnet.

(v) Sublimation of ammonium chloride. :- On heating ammonium chloride is changed to vapour state directly and on cooling the vapour is changed to solid. There is no change in the properties of ammonium chloride before and after the reaction.

Q. 97. Give some examples of chemical change and explain it.
Ans. :- (i) Heating mixture of iron filing and sulphur. :- It is a chemical change as new substance is formed. The properties of constituent elements are completely changed.
(ii) Rusting of iron. :- It is a chemical change. Rust is a new substance whose properties differ from iron completely. Rust is not attracted by magnet. Iron is an element and rust is a mixture of two oxides of iron.
(iii) Burning of candles. :- On reversing the process, no candle is recovered. It is completely changed to carbon dioxide and water. So, it is a chemical change.
(iv) Burning of wood. :- It is a chemical change. No woods are recovered on reversing the process. New substance is formed which are entirely different from wood.
(v) Curding of milk. :- The property of curd is different from that of milk. No milk is recovered from curd by any physical process. Hence it is a chemical change.

Q. 98. Melting of wax is a physical change but burning of candle is a chemical change. Why ?
Ans.:- (i) Melting of wax is a change of state from solid to liquid. When liquid wax is cooled it is changed to solid form. Hence it is a physical change.
(ii) Burning of candle is a chemical change because the wax of the candle burns to form carbon dioxide gas and water vapour. No wax is recovered.

Q.99. Classify the following as a physical or chemical changes :
Cutting of trees, melting of butter in a pan , rusting of almirah, boiling of water to form steam, passing an electric current through water and water breaking down into hydrogen and oxygen gases, dissolving of common salt in water, making a fruit saladwith raw fruits and burning of paper and wood.
Ans.:- Physical change :- cutting of tree, melting of butter in a pan, boiling of water to form steam, dissolving common salt in water, making a fruit salad from raw fruits.
Chemical change :- rusting of almirah, passing of electric current through water and the water breaking down into hydrogen and oxygen gases, burning of paper and wood.

Q. 100. Try segregating the things around you as pure substances or mixtures.
Ans.:- Pure substance :- Iron nails, water, alcohol, salt, sugar etc.
Mixture :- Watch, book, vegetable, C N G, milk, fruits, lime water, clothes, furniture etc.

Q. 101. What is element ?
Ans.:- An element is a substance containing same kind of atos. It can not be converted simpler than itself. For example iron is composed of only one kind of atoms, gold is composed of another kind of atoms.

Q. 102. What happens when red mercuric oxide is heated ?
Ans.:- When red mercuric (II) oxide is heated first slowly and then strongly a gas which supports burning is evolved and shining liquid is left.

$$2HgO \rightarrow 2Hg + O_2.$$

Q. 103. A substance that can not be decomposed under ordinary circumstances either by physical or by chemical process. Name it.
Ans.:- The substance is element, which can not be decomposed under ordinary condition.
Q. 104. What is compound. Give examples.
Ans.:- A compound is a substance containing two or more elements in a fixed proportion by weight. The properties of compound are entirely different from its constituent elements. Compounds may be decomposed into two or more substances. For example lime stone ($CaCO_3$) on heating gives lime and carbon dioxide gas.

$$CaCO_3 \rightarrow CaO + CO_2.$$

Q.105. Differentiate between an element and a compound.
Ans.:-

Element	Compound
(1) Element can not be broken into two or more simpler form by chemical method.	(1) Compound can be broken into two or more simpler form by chemical method.
(2) It is composed of atoms of only one kind of element	(2) It is composed of atoms of different elements in a fixed ratio by weight.

Q. 106. Classify each of the following as element, compound or mixture :
sugar, milk, diamond, iron, phosphorus, brass, air, water, urea, oxygen, carbon dioxide, glucose, bronze.
Ans.:- Element :- diamond, iron, phosphorus, oxygen.
Compound :- sugar, water, urea, carbon dioxide.
Mixture :- bronze, air, milk, brass.
Q.107. State in which of the following process, compound is formed :
(i) dilution of acid, (ii) mixing sand and chalk, (iii) crushing sulphur and iron filings, (iv) burning of magnesium in air.
Ans.:- (i), (ii), (iii) does not form compound. In (iv) when magnesium is burnt in air, magnesium combines with oxygen present in air to form magnesium oxide which is a compound.
Q. 108. Select the true statement from the following :-
(i) Air is compound, (ii) Blood is a compound, (iii) Mercury is an element, (iv) Milk is a homogeneous mixture.
Ans.:- Only (iii) is true.
Q.109. Give some examples of element, mixture and compound.
Ans.:- Elements :- sodium, hydrogen, chlorine, iron filings, oxygen, copper, mercury.
Compounds :- carbon dioxide, ammonia, water, common salt, pure marble.
Mixture :- brass, bronze, air, gun powder, soda water, steel, milk, blood, glass.

Q.110. Why hydrogen is called an element ?
Ans.:- (i) Hydrogen has only one kind of atom.
(ii) It can not be broken into new substances by ordinary physical or chemical process.
Q.111. Water is a compound. Why ?
Ans.:- Water is a compound because :
(i) It is composed of two elements : hydrogen and oxygen.
(ii) The ratio of hydrogen and oxygen is 2:1 in any sample of water.
(iii) Properties of water is different from hydrogen and oxygen.
(iv) It can be decomposed to hydrogen and oxygen easily.
Q.112. Name some gaseous elements, liquid elements and solid elements.
Ans.:- Gaseous Elements :- Oxygen, Nitrogen, Hydrogen, etc.
Liquid Elements :- Mercury and Bromine.
Solid Elements :- Gold, Aluminium, Iron, Copper, etc.
Q. 113. Name the elements present in the following compounds :
(i) Sodium Sulphate, (ii) Nitric Acid and (iii) Potassium Nitrate.
Ans. (i) Sodium Sulphate is a compound of sodium, sulphur and oxygen.
(ii) Nitric acid is a compound of hydrogen, nitrogen and oxygen.
(iii) Potassium nitrate is a compound of potassium, nitrogen and oxygen.
Q.114. A pure substance on heating leaves behind a white residue and gives out a colourless, odourless gas. Can you say that the given substance is an element, compound or mixture.
Ans.:- The substance on heating breaks up into a gas and a white residue, hence it can not be an element.
The substance is pure hence it can not be mixture.
Thus the given substance is a compound.
Q. 115. Guess the material which shows the following properties :
(i) Average properties of constituents contained in it.
(ii) Components has a fixed ratio.
(iii) Not converted into more simpler form by ordinary chemical method.
Ans.:- (i) Mixture (ii) Compound (iii) Element.
Q.116. Choose the elements from the following substances giving reason :
(i) Diamond (ii) Graphite (iii) Soda water (iv) Stainless steel (v) common salt (vi) Iron filings (vii) Copper wire.
Ans.:- (i) Diamond and (ii) Graphite are elements composed of same atoms of carbon.
(vi) Iron filings is element composed of iron atoms.
(vii) copper wire is an element composed of copper atoms.
(iii) Soda water and (iv) Stainless steel are mixture.
(v) common salt is a compound.
Q. 117. Which of the following are elements :
Water, Milk, Sulphur, Smoke, Manganese, Coke and Glucose.
Ans.:- Sulphur and manganese are elements.

Q. 118. Write physical properties of metals.
Ans.:- Physical properties of metals are :
(i) State. :- It is amorphous solid. Only mercury is liquid at room temperature. Metals retain its shape under normal conditions.
(ii) Hardness. :- It is hard. Sodium is soft which can be cut with knife easily. The hardness varies from metal to metal.
(iii) Metallic Lusture. :- The surfaces of metals are shining which can be increased by polishing.
(iv) Malleability. :- Metals can be beaten into fine sheets.
(v) Ductility. :- Metals can be drawn into wires of desired thickness.
(vi) Conductivity. :- It is good conductor of heat and electricity.
(vii) Sonority. :- It produces a ringing sound.
(viii) Melting Point. :- Metals have very high melting points.
(ix) Boiling Point. :- Metals have very high boiling point.
(x) Tensile Strength. :- It can be stretched up to some degree without breaking.
Q. 119. Write physical properties of non-metals.
Ans.:- Physical properties of non-metals are :-
(i) State. :- Non-metals are solid in crystalline form, liquid and gas.
(ii) Hardness. :- It is less hard than metals but diamond is very hard.
(iii) Lusture. :- It neither shine nor reflect light.
(iv) Conductivity. :- It is poor conductor of heat and electricity but graphite is a good conductor of heat and electricity.
(v) Non-metals are neither malleable nor ductile.
(vi) Non-metals have low melting and boiling points.
(vii) Non-metals do no produce sound on hitting.
(viii) They have low density.
Q. 120. What are metalloid. Explain with suitable examples.
Ans.:- Elements having properties intermediate between those of metals and non-metals are called metalloids.
Example. :- Silicon, Germanium, etc.
Q. 121. How many elements are known so far ?
Ans.:- !!5 elements are known so far. Among them 92 are natural and 23 are man made. 11 elements are gases, 2 are liquids and 102 are solid at room temperature.
Q. 122. State the numbers of non-metals. How many of them are solid, liquid and gases ?
Ans.:- 22 non-metals are known so far. 11 non-metals are gases, 1 is liquid and 10 are solids.
Q.123. State the examples where the property-malleability and ductility of metals are used in daily life.
Ans.:- The property of malleability is used to make sheets and foils of metals. Sheets are used in making roofs, box, canes etc. Aluminium foils is used for wrapping food stuff and medicines. Silver foils is used for decorating sweets and fruits.
The property of ductility is used to draw wires. Gold and silver wires are used to make ornaments. Aluminium and Copper wires are used in electrical appliances and to conduct electricity.

Q. 124.Give example of a metal which :
(i) is a liquid at room temperature, (ii) Can be cut easily with knife,
(iii) is the best conductor of heat , (iv) is the poorest conductor of heat.
Ans.:- (i) Mercury, (ii) Sodium, (iii) Silver,(iv) Lead.
Q.125. State the metals used for the following purposes :
(a) Household utensils and factory equipments,(b) Jewelries, (c) Packaging of food stuff, (d) Atomic energy and space research, (e) Transport of electricity.
Ans.:- (a) Aluminium, Iron and Copper; (b) Gold, Silver and Platinum; (c) Aluminium; (d) Uranium, Titanium and Zirconium; (e) Aluminium, Copper.
Q. 126. From the following list select the metals and non-metals. Also write their property on which they are classified :
(i) Aluminium, (ii) Carbon, (iii) Chlorine, (iv) Helium, (v) Silver, (vi) Sulphur, (vii) Sodium.
Ans.:- (i) Aluminium is a good conductor of heat and electricity. It is a metal.
(ii) Carbon is neither malleable nor ductile. It is non-metal.
(iii) Chlorine is a gas at room temperature. It is a non-metal.
(iv) Helium is a gas and does not conduct electricity. It is a non-metal.
(v) Silver is the best conductor of electricity and is lustrous. It is a metal.
(vi) Sulphur is neither malleable nor ductile. It is brittle. It is a non-metal.
(vii) Sodium is malleable and shows lusture. It is a metal.
Q. 127. State the properties of sodium in which it does not show the properties of metal.
Ans.:- (i) Metals have high density but sodium has density less than 1.
(ii) Metals are hard but sodium is so soft that it can be cut by knife.
(iii) Metals are sonorous but sodium is not sonorous.
Q.128. Write those properties of carbon which are not expected in non-metals.
Ans.:- (i) Non-metals are not lustrous but carbon in the form of diamond is very shining.
(ii) Non-metals are brittle but carbon in the form of diamond is hard.
(iii) Non-metals are bad conductor of heat and electricity but carbon in the form of graphite is good conductor.
Q.129. Differentiate between metals and non-metals.
Ans.:-

Metals	!	Non-metals
(1) It is solid at room temperature except mercury which is liquid.	!	(1) It is solid, liquid or gas at room temperature.
(2) It has shining luster.	!	(2) It has dull luster.
(3) It is hard substance.	!	(3) It is soft and brittle.
(4) It is malleable.	!	(4) It is non-malleable.
(5) It is ductile.	!	(5) It is not ductile.

(6) It has high density.	! (6) It has low density.
(7) It is good conductor of heat and electricity!	(7) It is bad conductor except graphite.
(8) It form alloys with other metals.	! (8) It does not form alloys.

Q.130. State the characteristics of a compound.

Ans.:- Characteristics of a compound are:

(i) Compounds are formed by the combination of two or more elements.

(ii) The ratio of constituent elements are fixed.

(iii) Compounds are formed due to chemical reaction.

(iv) Properties of compound differ from constituents elements.

(v) Constituent elements of a compound can not be separated by physical means.

Q. 131. What difference is observed when a mixture of iron filings and sulphur

(i) is crushed hard ?

(ii) is heated red hot ?

Ans.:- (i) It is a mixture. Its different constituents show their own property. Iron is attracted by magnet when passed over the mixture. When mixture is dissolved in carbon disulphide , sulphur is dissolved. When treated with dilute sulphuric acid hydrogen gas is evolved by the action with iron.

(ii) It is a compound. Its constituents has lost its original properties. When treated with dilute sulphuric acid, hydrogen sulphide gas with smell of rotten eggs is formed.

Q. 132.Which separation techniques will you apply for the separation of the following :

(i) Sodium chloride from its solution in water.

(ii) Ammonium chloride from a mixture containing sodium chloride and ammonium chloride.

(iii) Small pieces of metal in the engine oil of a car.

(iv) Different pigments from an extract of flower petal.

(v) Butter from curd.

(vi) Oil from water.

(vii) Tea leaves from tea.

(viii) Iron pins from sand.

(ix) Wheat grains from husk.

(x) Fine mud particles suspended in water.

Ans.:- (i) Crystallization or Evaporation. (ii) Sublimation.

(iii) Centrifugation or Sedimentation. (iv) Chromatography.

(v) Centrifugation. (vi) Separating Funnel. (vii) Hand-picking.

(viii) Magnetic Separation. (ix) Winnowing. (x) Centrifugation.

Q. 133. Write the steps you would use for making tea. Use the words – solution, solvent, solute, dissolve, soluble, insoluble, filtrate and residue.

Ans.:- The solvent water is heated in a kettle. When solvent boils, solute milk is added and we get a solution of milk and water. Some tea leaves are taken in a sieve and hot solution of milk and water is poured over the tea

leaf in the sieve. The colour of tea leaves dissolves in the hot solution of milk as filtrate. The insoluble leaves on the sieve as residue. Sugar being soluble is added in the tea in requisite amount.

Q. 134. Pragya, tested the solubility of three different substances at different temperatures and collected the data as given below (results are given in the following table, as grams of substance dissolved in 100 grams of water to form a saturated solution).

Substance dissolved	Temperature in K				
	283	293	313	333	353
Potassium Nitrate	21	32	62	106	107
Sodium Chloride	36	36	36	37	37
Potassium Chloride	35	35	40	46	54
Ammonium Chloride	24	37	41	55	66

(a) What mass of potassium nitrate would be needed to produce a saturated solution of potassium nitrate in 50 gram of water at 313 K.

(b) Pragya makes a saturated solution of potassium chloride in water at 353 K and leaves the solution to cool at room temperature. What would she observe as the solution cools ? Explain.

(c) Find the solubility of each salt at 293 K. Which salt has the highest solubility at this temperature ?

(d) What is the effect of change of temperature on the solubility of a salt ?

Ans.:- (a) In 100 g dissolved salt is 62 g

In 1 g dissolved salt is 62/100 g

In 50 g dissolved salt is (62/100) × 50 g = 31 g.

(b) At room temperature (293 K) potassium chloride precipitated is 54 – 35 = 19 gm.

(c) At 293 K, solubility of different salt is given below :

Potassium Nitrate – 32 g, Potassium Chloride – 35 g, Sodium Chloride – 36 g

Ammonium Chloride – 37 g.

Highest solubility at this temperature is of ammonium chloride.

(d) Solubility is proportional to temperature.

Q. 135. Explain the following giving examples :

(a) Saturated Solution, (b)Pure Substance, (c) Colloid, (d) Suspension.

Ans.:- (a) Saturated Solution :- A solution in which no more solute can be dissolved at a given temperature is called a saturated solution. Suppose 40 g of solute is dissolved in 100 g of solvent at 313 K, 140 g of solution is obtained.

(b) Pure Substance :- The substances which have same colour , texture, taste at a given temperature and pressure is called pure substance. It has a fixed melting and boiling points at a given pressure. For example pure water is colourless, tasteless and odourless and melts at 273 K and boils at 373 K at N.T.P.

(c) Colloid :- A heterogeneous mixture, size of whose particles in a liquid is between 1 nm to 100 nm and the constituents can not be separated by sedimentation or filtration is called colloid. For example :- milk, fog etc.

(d) Suspension :- A heterogeneous mixture of visible small particles of solution in liquid is called suspension. When left undisturbed, the particles settle down to the bottom under the effect of gravity. Size of the solid particles is greater than 100 nm. For example mud water, sand water, etc.

Q. 136. Classify each of the following as homogeneous or heterogeneous mixture :
soda water, wood, air, soil, vinegar, filtered tea.
Ans.:- Homogeneous mixture :- soda water, air, vinegar, filtered tea.
Heterogeneous mixture :- wood, soil.
Q. 137. How would you confirm that a colourless liquid given to you is pure water ?
Ans.:- If the given colourless liquid boils at 373 K at S. T. P. then it is pure water.
Q. 138. Which of the following materials fall in the category of a "pure substance" ?
(a) Ice (b)Milk (c) Iron (d) Hydrochloric acid (e) Calcium oxide (f) Mercury (g) Brick (h) Wood (i) Air.
Ans.:- Pure substances are :-
(i) Ice – it is a compound. (c) Iron – it is an element. (d) Hydrochloric acid – it is a compound. (e) Calcium oxide – it is a compound. (f) Mercury – it is an element.
Q. 139. Identify the solutions among the following mixture :
(a) Soil (b) Sea water (c) Air (d) Coal (e) Soda water.
Ans.:- Solutions are :- (b) Sea water (c) Air (e) Soda water.
Q.140. Which of the following will show "Tyndall effect" ?
(a) Salt solution (b) Milk (c) Copper sulphate solution (d) Starch solution.
Ans.:- (b) Milk and (d) Starch solution will show "Tyndall effect" as they are colloids.
Q. 141. Classify the following into elements, compounds and mixtures :
(a) Sodium (b) Soil (c) Sugar Solution (d) Silver (e) Calcium Carbonate (f) Tin (g) Silicon (h) Coal (i) Air (j) Soap (k) Methane (l) Carbon Dioxide (m) Blood.
Ans. :- Elements :- (a) Sodium (d) Silver (f) Tin (g) Silicon.
Compounds :- (e) Calcium Carbonate (k) Methane (l) Carbon Dioxide.
Mixture :- (b) Soil (c) Sugar Solution (h) Coal (i) Air (j) Soap (m) Blood.
Q. 142. Which of the following are chemical changes ? :
(a) Growth of plant (b) Rusting of iron (c) Mixing of iron filings and sand (d)Cooking of food (e) Digestion of food (f) Freezing of water (g) Burning of candle.
Ans.:- (a) Growth of plant (b) Rusting of iron (d) Cooking of food (e) Digestion of food (g) Burning of candles are chemical change.

BEST OF LUCK.

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