Grade IX

Lesson : 2 Is Matter Around Us Pure?

MATTER

All the substance around us have different shape, sixe and texture. Everything in universe is made up of matter

- **Classification**
  - **Pure Substance**
    - **Elements:** An elements is the basic form of matter that cannot be broken down into simpler substance by chemical reaction. Approx 118 elements are known till today which comprises of solids, liquids and gases
      - **Metals:** Those elements Which are
        - Hard
        - Malleable and ductile
        - Good conductor of heat and electricity.

        Example: Gold, Silver, Iron, Copper, Nickel etc.,
      - **Non- Metals:** Those elements Which are
        - Soft
        - Brittle
        - Poor conductor of heat and electricity

        Example: Hydrogen, Nitrogen, Oxygen, etc.,
      - **Metalloids:** Those elements which resemble with metals as well as non-metals. These are semi conductors. Example Boron, Silicon, Germajium etc.,
    - **Compound:** A compound is a substance which is made up of two or more elements chemically combined with each other in a fixed ration
  - **Impure Substance or Mixture**
- **Change**
  - **Physical Change:** Thouse changes which involve transformation of state and does not change composition and chemical nature of the substance
  - **Chemical Change:** It is the change in which one or more substance are converted into one or more different substances.

IMPURE SUBSTANCE OR MIXTURE

Substance contains more than one elements or compound which are not in any fixed ratio,

- **Homogeneous Mixture:** Mixture which has uniform composition, for example. Copper sulphate dissolves in water forms homogeneous mixture
  - **True Solution:**
    - It is homogeneous
    - The particles are very small, i.e. less than $10^{-9}m$ (1nm)
    - The solute particles do not show Tyndall effect
- **Heterogeneous Mixture:** Mixture which does not have uniform composition. For exa,[;e: Iron fillings and sulphur power

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HETEROGENEOUS MIXTURE

Colloidal Solution
- It appears to be homogeneous but actually it is heterogeneous
- The size of particles ranges from 1 to 1000 nm
- The solute particles show Tyndall effect

Suspension
- It is heterogeneous.
- The particles are larger than 1000 nm in diameter
- They do not show Tyndall effect.

Tyndall effect
When a beam of light is passed through a colloidal solution placed in a dark place, its path becomes visible.

IMPORTANT TERMS RELATED TO TRUE SOLUTION
Substance contains more thatn one element or compound which are not in any fixed ratio.

Dilute Solution:
A solution having small amount of solute in given solvent.

Concentrated Solution:
A solution having large amount of solute in given solvent.

Saturated Solution:
A solution in which no more solute can be dissolved at a particular temperature.

Unsaturated Solution:
If more amount of solute can be dissolved in the given amount of solution

Solubility:
The maximum amount of solute that can be dissolved in 100 grams of solvent ata particular temperature.

Concentration of solution:
The measuring amount of solute dissolved per litre of solution.

Substance more than one element or compound which are not in any fixed ratio.

Effect of temperature on solubility	Effect of pressure of solubility
(1) Solubility of solid solutes in liquids solubility increases with increase in tempearure,	(1) Solubility of solid solutes in liquids pressure has no effect in this case
(2) Solubility of gas in liquids solubility decreases with increase in temperature	(2) Solubility of gas in liquids solubility increase with increase in pressure.

Mass by mass percentage of a solution	Mass by volume percentage of a solution	Volume by Volume percentage of a solution
Mass by Mass % of Solution $= \frac{Mass\ by\ Solu}{Mass\ of\ solution} x100$	Mass by Volume % of Solution $= \frac{Mass\ by\ Solution}{Volume\ of\ solution} x100$	Volume by Volume % of Solution $= \frac{Volume\ by\ Solute}{Volume\ of\ solution} x100$

Objective Type Questions

I. Multiple choice questions

1. A pure substance / element contains,

a) two or more types of particles b) one type of particles

c) many type of particles d) two or more forms of matter

b) one type of particles

2. Which of the following is a colloidal solution?

a) Strach solution b) Copper sulphate solution

c) Chalk powder in water d) Kerosene oil and water

a) Strach solution

3. Which of the following is not a mixture?

a) Soap solution b) Blood c) Carbon dioxide d) Coal

c) Carbon dioxide

4. Which of the following is a physical change?

a) Burning of a candle b) Rusting of iron

c) Freezing of water d) Digestion of food

c) Freezing of water

5. Which of the following has the highest solubility at 293 K?

a) Melting of wax b) Mixing of iron filings with sulphur powder

c) cooking of food d) Dissolving salt in water

6. Which of the following has the highest solubility at 293 k?

a) KNO_3 b) NaCl c) KCl d) NH_3Cl

d) NH_3Cl

7. Which of the following has the highest solubility at 293 k?

a) KNO_3 b) NaCl c) KCl d) NH_3Cl

a) KNO_3

8. Which of the following statements is true?

a) Homogeneous mixtures can have variable composition

b) Homogeneous mixtures fixed composition

c) Heterogeneous mixtures have fixed composition

d) Salt solution is heterogeneous mixture

a) Homogeneous mixtures can have variable composition

9. Alloys are

a) pure substances b) homogeneous mixtures

c) compounds d) of fixed composition

b) homogeneous mixtures

10. The size of particles of true solution is

a) < 1 nm b) Between 1nm to 100nm

c) > 100 nm d) > 1000 nm

11. Which of the following is the most stable?

a) True solution b) Collodial solution c) Suspension d) Milk

a) True solution

12. 40g of common salt is dissolved in 320g of water. The mass percentage of salt is

a) 11.1% b) 12.5% c) 15% d) 10%

a) 11.1%

13. Which of the following statements is not correct?

a) Colloidal solution is homogenous

b) Colloidal solution appears to be homogeneous but actually it is heterogeneous

c) Colloidal solution shows Tyndall effect

d) Sky is blue due to Tyndall effect

a) Colloidal solution is homogenous

14. The particles of suspension

a) can't be seen with naked eye

b) Can't be seen with the help of powerful microscope

c) can be seen with naked eye

d) Can't be seen with electron microscope

c) can be seen with naked eye

15. The particles do not settle down in case of

a) true solution b) colloidal solution c) suspension d) both a and b

d) both a and b

16. The particles of colloidal solution can be separated by

a) evaporation b) filtration c) centrifugation d) distillation

c) centrifugation

17. The dye from blue fountain pen ink can be separated by

a) evaporation b) distillation c) chromatography d)separating funnel

c) chromatography

18. What is the percentage of fat present in milk of full cream?

a. 6.0% b) 4.0% c) 3.0% d) 1.5%

a. 6.0%

19. The type of protein present in milk of full cream?

a) casein b) albumin c) soyabean d) keratin

20. Kerosene oil and water can be separated by

a) separating funnel b) distillation c) centrifugation d) evaporation

a) separating funnel

21. Mixture of Blue ink and red ink can be separated by

a) evaporation b) separating funnel c) chromatography d) distillation

c) chromatography

22. Acetone and water can be separated by

a. distillation b. fractional distillation

c. steam distillation d. evaporation

a. distillation

23. Which has the lowest boiling point?

a. 0_2 b. Ar c. N_2 d. Br_2

c. N_2

24. Petrol is obtained from petroleum by

a. distillation b. fractional distillation

c. Steam distillation d. distillation under reduced pressure

b. fractional distillation

25. 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)

c. (i) and (iv)

26. Which of the following are physical changes?

i) Melting of iron metal ii) Rusting of iron

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, ii, and iv d) ii, iii and iv

c) i, ii, and iv

27. Which of the following are chemical changes?

i. Decaying of wood ii. Burning of wood

iii. Sawing of wood iv. Hammering of a nail into a piece of wood

a. i and ii b. ii and iii c. iii and iv d. i and iv

a. i and ii

28. Two substances, A and B were made to react to form a third substance, A_2B according to the following reaction?

2 A+B A_2B

Which of the following statements concerning this reaction are incorrect?

i. The product A_2B shows the properties of stances A and B

ii. The product will always have a fixed composition

iii. The product so formed cannot be element

iv. The product so formed is an element.

a) i, ii and iii b)ii, iii and iv c) i, iii, and iv d. ii, iii and iv.

c) i, iii, and iv

29. Two chemical species X and Y combine together to form a product P which contains both X and Y

X + Y P

X and Y cannot be broken down into simpler substances by simple chemical reactions. Which of the following concerning the species 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

d) i, iii and iv

1. a	2. a	3. c	4. d	5. c	6. d	7.a	8. a	9. b	10.a
11. a	12. a	13. a	14. c	15. d	16. c	17. a	18. a	19. a	20.a
21. c	22. a	23. c	24. b	25. c	26. c	27. a	28. c	29. d	

I. Match the following

30. Match the column I with Column I I

Column I	Column I I
1. Common salt from sea water	a. Gel
2. Suspension	b. Evaporation
3. Brass	c. Centrifugation
4. Cream from milk	d. Solid in solid mixture
5. liquid in solid	e. Heterogeneous

1. b	2. e	3. d	4. c	5. a

I. Fill in the blanks

31. _____is a non-metal with lustrous appearance.

32. Brass is an alloy composed of _____ and _____.

31. Iodine	32. Copper, zinc

I. True or False

33. Pure substances have fixed melting point

34. The properties of compound are similar to that of its components

33. True	34. False

Direction (Q35 to Q37: In the following questions, the Assertion and Reason have been put forward. Read the statements carefully and choose the correct alternative from the following:

a) Both the Assertion and the reason are correct and the reason is the correct explanation of the Assertion

b) The Assertion and the Reasons are correct but the Reason is not the correct explanation of the Assertion.

c) C. Assertion is true but the reason is false.

d) The statement of the Assertion is false but the Reason is true.

35. Assertion : Silver bromide compound is made of silver and bromine elements.

Reason : Silver bromide is a pure substance.

b) The Assertion and the Reason are correct but the reason is not the correct explanation of the Assertion.

36. Assertion : A saturated solution becomes super saturated on cooling.

Reason : It is because solubility decreases with decrease in temperature.

a) Both the Assertion and the Reason are correct and the Reason is correct explanation of the Assertion.

37. Assertion : 5 ml of alcohol is dissolved in 75 ml of water . Its volume / volume percentage is 6.25%.

Reason: Volume changes with change in temperature

b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.

38. State any one difference between pure and impure substance.

Pure substances has fixed melting and boiling point where as impure substances does not have fixed melting and boiling point.

39. What are the two components of a solution?

Solute and solvent are two components of solution.

40. How can you convert a saturated solution into an unsaturated saturation?

When we heat saturated solution it can be converted in to unsaturated.

41. What is meant by concentration of a solution?

Concentration of solution is defined as amount of solute dissolved in fixed amount of solution.

42. Identify homogenous mixture from the following :

Soda water, soil, vinegar, unfiltered tea.

43. Write dispersed phase and dispersion medium of emulsion

Both dispersed phase and dispersion medium are liquids.

44. Give two examples of suspension

Muddy river water, chalk powder in water.

45. Choose the chemical change out of the following:

Digestion of food, Freezing of water, Glowing of electric lamp, Mixing of Iron filings with sulphur.

Digestion of food is a chemical change

46. Give one example for two miscible liquids when distillation can be used for separating them.

Acetone and water.

47. Which type of solution is formed when milk and water is mixed uniformly

Colloidal solution.

48. Identify the solute and solvent in: tincture of iodine.

Iodine is solute, alcohol is solvent.

49. Explain how the separation of cream from milk takes place.

Cream can be separated from milk by centrifugation.

50. What do you observe on churning the milk?

The cream from the milk gets separated.

51. What happens when saturated solution is allowed to cool"?

Crystals of pure substance will be formed.

52. Define mixture?

It contains two or more substances in any ratio.

53. What is solute and solvent in brass?

In brass copper is a solvent and zinc is solute because copper is 70% and zinc is 30%.

54. What is solute and solvent in air?

In air, O_2 is solute and N_2 is solvent because N_2 is in large quantity whereas O_2 is in smaller amount.

55. Why is sky blue in colour?

It is due to Tyndall effect. Dust particles and water vapours in air scatter blue light which reaches our eyes and sky looks blue to us.

56. List the two conditions essential for using distillation as a method for separation of the components from a mixture.

i) Liquids should be miscible i.e. should mix. With each other.

ii) They should have large difference in their boiling points (25^0c or more)

57. What is meant by fractionating column?

Fractionating column is a tube packed with glass beads which provide surface for vapours to cool and condense. It gives the effect or repeated distillation.

58. Name the process used to obtain pure copper sulphate from impure sample.

Crystallization is used to obtain pure copper sulphate from impure sample.

59. Why are metals good conductions of heat and electricity whereas non-metals are not?

Metals are good conductors of heat and electricity because they free electrons whereas non-metals are not good conductors of heat and electricity because electrons are not free to move in non-metals.

60. Why are silicon and germanium metalloids

Silicon and germanium show the properties of both metals as well as non metals, , therefore called metalloids.

61. How many elements are known to us till today?

118 elements are know to us till today.

62. How many elements are naturally occurring?

90 are naturally occurring whereas 28 are man made elements

63. Name two metals which exist as liquids above 30^0 c

Mercury and Gallium

64. Define a solution. Give an example of gas in liquid solution.

Solution is homogenous mixture of two or more substances.

Cold drinks contain carbon dioxide gas dissolved in liquid water.

65. Explain the term centrifugation? Give one of its application

Churning at high speed, denser particles settle at the bottom separating cream from milk.

Washing machine and urine test are based on centrifugation.

66. What are heterogeneous mixtures?

Those mixture whose composition is not uniform throughout are called heterogeneous.

67. Why mixture does not have a fixed melting or fixed boiling point? Give two reasons.

a) It is because they do not have fixed composition

b) No new compound is formed in the mixture.

68. Define Tyndall effect.

When a beam of light is passed through a colloidal solution placed in a dark place, its path becomes clearly visible. This phenomenon is called Tyndall Effect.

69. Why is water considered a compound? Mention two point.

Water is compound because :

a) It has hydrogen and oxygen in fixed ration

i.e. 2: 1

b) It can be separated into H_2 and $O_2$by electrolysis, i.e by chemical method.

70. What term is given to a mixture having uniform composition and no distinct components?

Homogeneous mixture

71. What are the essential conditions to separate any dyl using paper chromatography?

The components of mixture should differ in solubility in the same solvent

72. How do sol and gel differ from each other ? Give one example for each.

Sol	Gel
1. Solids dispersed in liquid	1. Liquid is dispersed in solid.
2. Starch is dispersed in water sol	2.Water is dispersed in paneer, hair gel

73. Which separation technique is best suitable for removing grease stains from clothes. Explain the process also.

Grease is soluble in organic solvent like petrol or kerosene.

74. Can we separate sugar solution by using a separating funnel?

No, sugar solution cannot be separated by separating funnel because it is homogeneous.

75. Do mixtures have definite chemical formula?

No, mixture do not have definite chemical formula because their composition is not fixed

76. 5 g of sugar is dissolved in 250 ml of solution. Calculate its mass percentage by volume

Mass of solute (sugar) = 5g

Volume of solution = 250 ml

Mass by volume percentage of solution

$= \frac{Mass\ of\ solute}{Mass\ of\ solution}$ x 100 $= \frac{5}{250}$ x 100 = 2%

77. Give the difference between mixture and compound.

Mixture	Compound
1. It does not have fixed composition	1. It has fixed composition
2. Its components can be separated by physical methods.	2. Its components can be separated by chemical methods.

I. Short answer questions

78. Write down the processes involved in sequential order to get the supply of drinking water to your home from the water to your home from the water works.

Reservoir → Sedimentation tank → Loading tank → Filtration tank → Chlorination kill bacteria → To Home

1. Water is passed through sedimentation tank in which heavy impurities settle down due to gravity
2. Loading tank contains potash alum which helps in making sedimentation faster by suspending impurities which are lighter.
3. Filtration tank removes insoluble suspended impurities
4. Chlorination tank is used to disinfect water and make it fit for drinking which is supplied to our homes.

79. Define solubility. How does solubility. How does solubility of a solid in water change with temperature?

Solubility is defined as amount of substance dissolved in given amount of solvent solubility of solid in water increases with increase in temperature.

80 . A solution of alcohol in water has been prepared by mixing 150 ml of alcohol with 600 ml of water . Calculate the volume. Percentage of the solution.

$$\% \text{ by volume} = \frac{Volume\ of\ alcohol}{Volumr\ of\ alcohol + volume\ of\ water} \times 100$$

$$= \frac{150}{150+600x\ 100} = \frac{150}{750} \times 100 = 20\%$$

81. Two students A and B were given 10 ml of water is a bowl and a plate respectively. They were told to observe the rate of evaporation. Name the student whose water evaporates faster and explain its reason.

Water of 'B' will be evaporated faster

It is because surface area is more in plate. Therefore, rate of evaporation become faster. Rate of evaporation become faster . Rate of evaporation depends upon surface area. Greater the surface area, more will be rate of evaporation. That is why we drink hot tea from saucer easily then from a cup.

82. Why the inter-conversion of states of matter is considered as a physical change? Give three reasons to justify your answer.

i) It is because it occurs without change in composition.

ii) The substances differs in physical properties but chemically they are same. E.g. water changes into ice below 0^0C. Ice changes into liquid water changes into stream at 100^0C. Physical states of water are different due to different force of attraction and intermolecular spaces but composition is same, i.e. all of them contain same water molecules.

iii) No new substance with new properties will form.

83. a) Define an element

b) What is meant by Malleability. Name any two substances that are malleable.

a) Element is a substance which is made up only one kind of atoms.

b) Malleability is a property due to which a metal can be beaten into sheets. Godl and silver are highly malleable.

84. Differentiate between an element and a compound (any twopoint) Write one examples of each.

Element	Compound
1. It consists of one kind of atoms	1. It consists of one kind of molecules made up two or more types of atoms.
2. These are simple set substances and cannot be broken into simpler substances Example : Hydrogen	They can broken down into simpler substances Example : Water

85. a) Name the separation technique you would follow to separate

i) Dyes from black ink

ii) A mixture of salt and ammonium chloride

iii) Cream of milk

iv) Sodium chloride from its solution in water

b) State the principle used in separating a mixture of two immiscible liquids

a) i) Chromatography ii) Sublimation iii) Centrifugation iv) Evaporation

b) The principle used in separation of immiscible liquids by separating funnel is difference in their densities. Heavier liquid will form lower layer which will get separated first. Lighter liquid will form upper layer, so it will get separated later.

86. Why copper sulphate solution in water does not show tyndall effect but mixture of water and milk shows.

Copper sulphate solution does not show tyndall effect because particles are very small and do not cause scattering of light.

Water and milk form colloidal solution which shows Tyndall effect because particle are larger which causes scattering of light and show Tyndall effect.

87. Name the separation technique by which we can obtain coloured components from ink? Give two more application of the technique used.

Chromatography is used to obtain coloured components from ink.

Application (i) Pigments from natural colour can be separated by chromatography

(ii) Drugs from blood can be separated by chromatography.

88. Define evaporation. Explain any two factors that affects its rate.

Evaporation is a process in which liquid changes into vapours.

Factors affecting evaporation:

i) Surface area: Greater the surface area, more will be rate of evaporation, e.g. tea becomes cold in saucer more easily, than in a cup.

ii) Temperature: Higher the temperature, more will be rate of evaporation. Clouds are formed in summer due to higher rate of evaporation.

89. a) Write one difference between concentration and solubility?

b) What is the effect of temperature on the rate of solubility?

a) Concentration is defined as amount of substances dissolved in 100 g of solution at a particular temperature.

b) Solubility increases with increase in temperature in case of solid dissolved in temperature in case of solid dissolved in liquid. The solubility of gases dissolved in liquid. The solubility of gases dissolved in liquid decreases with increase in temperature.

90. List three differences between metals and non-metals

Metals	Non-metals
1. They are malleable and ductile	1. They are not malleable
2. Most of them are solids except mercury	2. They exist as solid liquid as well as gases.
3. They are hard mostly except Na, K	3. They are soft and brittle except diamond.

91. a) Give any one point of difference between true solution, colloidal solution and suspension.

b) 20 g of sodium chloride is dissolved in 100 ml of water. How will you test whether the given solution is saturated or unsaturated at the given temperature?

c) Suggest anyone method by which we can increase the solubility of saturated solutions.

a) True solution is homogeneous and transparent.

Colloidal solution appears to be homogeneous but actually it is heterogeneous and translucent

Suspension is heterogeneous and opaque.

b) Add more salt into it. Stir it with the help of glass rod. If it dissolved, it is unsaturated. If it does not dissolve, the solution is saturated.

c) If we increase temperature, solubility can be increased.

92. a) List any three characteristic of colloid.

b) Name the two components of a colloid

c) Identify colloid from the following mixtures, Muddy water, sugar in water,ink, blood, soda water, foam

a) i) It appears to be homogeneous but actually it is heterogeneous.

ii) It is translucent

iii) Its particle can be seen with powerful microscope.

b) Dispersed phase and dispersion medium are two components of colloids.

c) Ink, blood, foam are colloidal solution.

93. What is chromatography? State its principle. Write one advantage of chromatography over other techniques.

Chromatography : Kroma means colour in Greek and graphy means separation. Chromatography is a process of separation of those solutes which dissolve in the same solvent . It was first used to separate coloured substances. These days, it can be used to separate colourless substances also. The components of orange ink can be separated experimentally with the help of chromatography.

Principle : It is based on the principle that different substances dissolve in the same solvent to different extent.

Advantages : It is useful to separate even small quantity of substances.

94. Calculate the amount of water required to prepare 500 g of 2.5 % solution of sugar.

Mass by mass percentage of solution

$= \frac{Mass\ of\ solute}{Mass\ of\ solution}$ x 100

$2.5 = \frac{Mass\ of\ solute}{500}$ x 100

Mass of solute $= \frac{2.5\ x\ 500}{100}$ = 12.5 g

Mass of water = Mass of solution – Mass of solute

Mass of water = 500 -12.5 = 487.5

95. How many litres of 15% (mass/volume) sugar solution would it take to get 75 g of sugar.

Mass by volume %

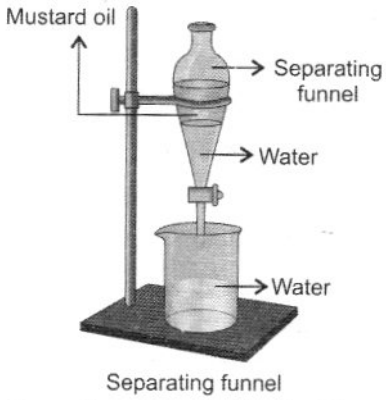
$= \frac{Mass\ of\ sugar}{Volume\ of\ solution\ (x)}$ x 100

$15 = \frac{75}{x}$ x 100

$\Longrightarrow x = 500$ ml ; $x = 0.5$ L

I. Long answer question

96. Rahul's mother mixed oil and water in kitchen by mistake. Rahul told her that can separate the mixture. Name the technique used by Rahul and explain how he will do. Draw the diagram and write the principle of this technique.



Separation of Immiscible liquids by using separation funnel

i. The technique is called gravity separation by using separating funnel.

ii. He will put the mixture of liquids in separating funnel.

iii. Oil and water will form separate layer. Lighter layer forms a upper layer, heavier (water) will form lower layer.

iv. When stop cock of separating funnel is opened, water will come out.

v. Close the stop cock

vi. When stop cock is opened again, oil will come out and both will get separated.

vii. This process is based on the principle of difference in the density of two liquids.

97. A student was given a mixture of iron filing and sulphur? He was told to heat it and observe the compound

a) What is colour of the compound formed?

b) Write the effect of magnet on it

c) Write the action of carbon disulphide on it

d) Describe the effect of adding dilute hydrochloric acid to it. Identify the gas and write its two properties.

a) Black b) No effect c) No effect d) H_2S gas is evolved.

i) It has smell of rotten eggs. ii) It is acidic in nature

98. Write your observation when the following processes take place.:

a) an aqueous solution of sugar is heated till it gets dried up.

b) a saturated solution of KCl at 60^0 C is allowed to cool at room temperature.

c) a mixture of iron filing and sulphur powder is heated strongly.

d) a beam of light is passed through colloidal solution.

e) dil HCl is added to mixture of iron filings and sulphur powder

a) Sugar remains as residue in form of solid mass

b) Crystal of KCl are formed

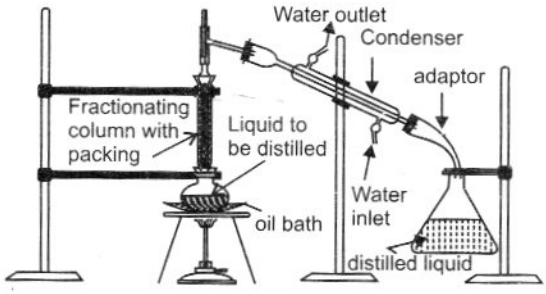
c) A black coloured solid called iron sulphide is formed.

d) The path of light becomes clearly visible due to scattering of light by colloidal particles.

e) A colourless and odourless hydrogen gas is evolved.

99. Boiling point of alcohol is 78^0C and that of water is 100^0C. Explain separation technique will you use to separate them from a mixture? Which liquid will be separated first and which will be left behind? Draw a diagram to show the apparatus and the set up used in the process.

The process used is distillation. It is double process of evaporation followed by distillation.



i) Take mixture of alcohol and water in the distillation flask.

ii) Set the apparatus as shown in diagram

iii) Start the flow of water into condenser

iv) Start heating with the help of burner

v) Note down the continuous temperature.

vi) At 78^0C alcohol will change into vapour completely and get condenser to get pure alcohol.

Alcohol will be separated first, whereas water will be left behind.

100. Identify the physical and chemical changes from the following:

a) Heating the mixture of iron and sulphur.

b) Ripening of fruits

c) Dissolution of salt in water

d) Rusting of iron- chair

d) Making egg omelets.

a) Chemical change

b) Chemical change

c) Physical change

d) Chemical change

e) Chemical change

101. a) While diluting a solution of salt in water a student accidentally added acetone (boiling point 58^0C) to it. What technique can be applied to get back acetone and what is principle involved in the technique?

b) Write three differences between physical and chemical change

a) Distillation can be used to get back acetone.

Acetone has lower boiling point than water. Large difference in boiling point is basic principle of distillation.

Acetone is a volatile liquid having less boiling point and it mixes with salt solution.

Miscible liquids are separated by distillation because they differ in their boiling point.

Acetone has lower boiling point, therefore, it will change into vapours easily and on cooling vapours form acetone liquid and get separated from mixture.

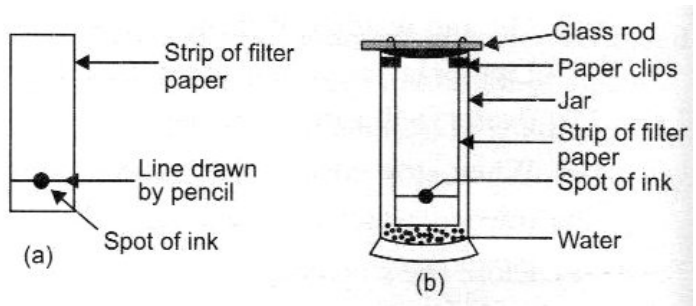
b)

Physical change	Chemical change
1. No new substance is formed	1. New compounds with new properties will be formed
2. It is reversible	2. It is irreversible
3. No or little heat is involved	3. Heat is evolved or absorbed.

102. What is chromatography? How will you separate the components of black ink using chromatography? Write any two applications of chromatography.

Chromatography : Kroma means colour in Greek and graphy means separation. Chromatography is a process of separation of those solutes which dissolve n the same solvent. It was first used to separate coloured substances. These days, it can be used to separate coloured substances also. The components of black ink can be separated experimentally with the help of chromatography.

Take a thin strip of chromatographic paper as shown in diagram.



- Draw a line using a pencil approximately 1 inch above the smaller edge as shown in figure.
- Put a small spot of ink at the center of line with the help of sketch pen or capillary tube. Let it dry.
- Suspend the chromatographic paper into the gas jar containing mixture of 50% ethanol and water as shown in figureand leave it undisturbed. Watch carefully, as solvent rises up on the chromatographic paper.
- Stop the process when black ink gets separated into its components.

Applications of Chromatography :

- It is used to separate amino acids which form proteins.
- It is used to separate colours of the dye.

103. a) List any four properties of a colloid and mention any two properties in which colloids differ from suspension

b) State what is Tyndall effect? Which of the following solutions will show Tyndall effect?

Starch solution sodium chloride solution Tincture iodine, air

a) i) Their particles can be seen with powerful microscope.

ii) They appear to be homogeneous but actually they are heterogeneous

iii) They show Tyndall effect

iv) They can pass through filter paper.

Difference from suspension:

i) In suspension residue is left on filter paper whereas in colloidal solution, particles pass through filter paper.

ii) In suspension, particles can e seen with naked eyes where as in colloidal solution it can't be seen.

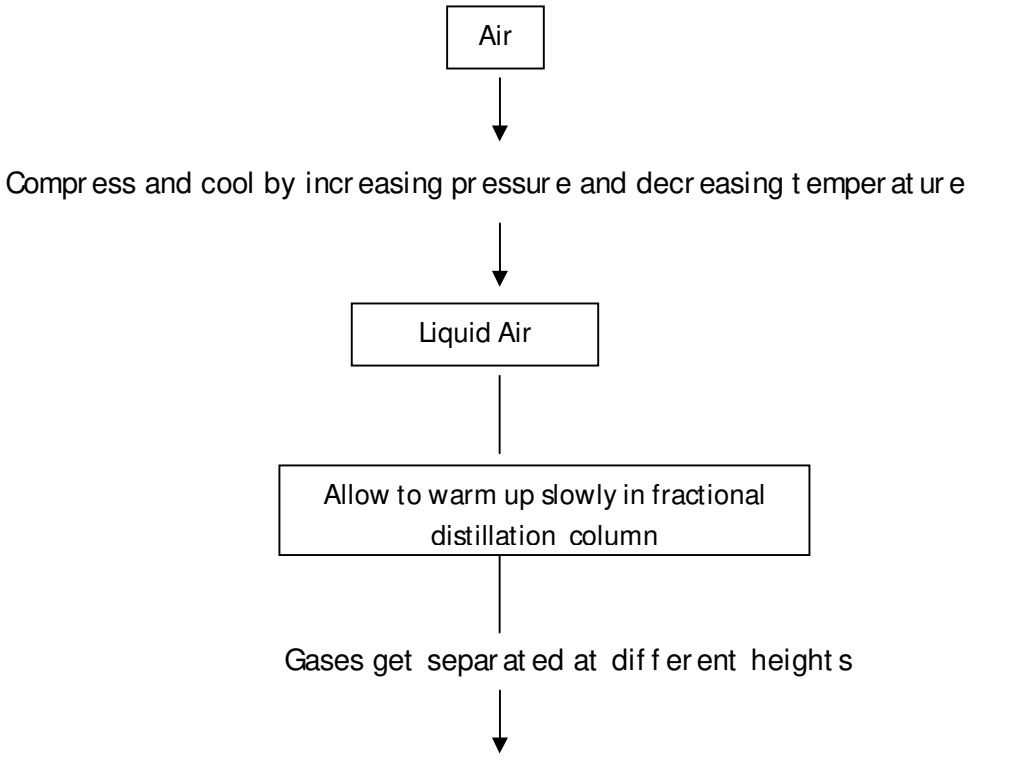
(b) Tyndall Effect: When a beam of light is passed through a colloidal solution placed in a dark place, its path becomes clearly visible. This phenomenon is called Tyndall Effect.
Starch solution will show Tyndall effect.

104. a) You are given a mixture of sand, water and mustard oil. How will you separate the components of this mixture? Explain it with the help of different separation methods involved in it.

b) Give flow diagram showing the process of obtaining gases from air.

Filter the mixture. Sand will be residue. Mustard oil and water will be filtrate

- Take mustard oil and water in separating funnel.
- Open the stop cock, water will come out first. Collect it in a beaker. Mustard oil will be left in separating funnel and get separated.



	Oxygen	**Argon**	**Nitrogen**
Boiling Point (^{0}C)	-183 ^{0}C	-186 ^{0}C	-196 ^{0}C
% Air by volume	20.9	0.9	78.1

Flow diagram shows the process of obtaining gases from air

105. a) How much water should be added to 15 g of salt to obtain 15% salt solution?

b) What is the main difference between aqueous solution and non- aqueous solution?

c) Why does solution of sodium chloride not show Tyndall effect where as the mixture of after and milk shows?

a) Mass percentage

$= \frac{Mass\ of\ solute}{Mass\ of\ solute + Mass\ of\ solvent}$ x 100

$15 = \frac{15}{15 + Mass\ of\ solvent}$ x 100 Mass of Solvent = 85g

b) Aqueous solution is solution is solution in water. Non –aqueous solution is solution in any other solvent except water

c) Particles of NaCl solution , Na^+ and Cl^- are very small and can't scatter light whereas particles of milk are bigger and can scatter light.

106. How will you justify the following changes are chemical change?

a) Gasoline burning b) Egg cooking c) Bread rising

d) Milk turning sour e) Sun tanning

a) It products carbon dioxide and water along with lot of energy, i.e. new substances are formed with lot of energy, i.e. new substances are formed with lot of energy change.

b) Boiling of egg leads o denaturation of protein which is a chemical change because it cannot be reversed.

c) Rising of bread is due to carbon dioxide produced by heating baking soda, it cannot be reversed.

d) Milk become sour due to fermentation and it cannot be reversed.

e) Sunlight reacts with upper part of skin and changes the colour of skin. It cannot be reversed

107) How will you justify the following changes are physical changes?

a) Whipping egg whites

b) Magnetising a compass needle

c) Dicing potatoes

d) Dissolving coffee power in water

e) Boiling vinegar

a) It does not produce any new substance. It only changes physical state or appearance.

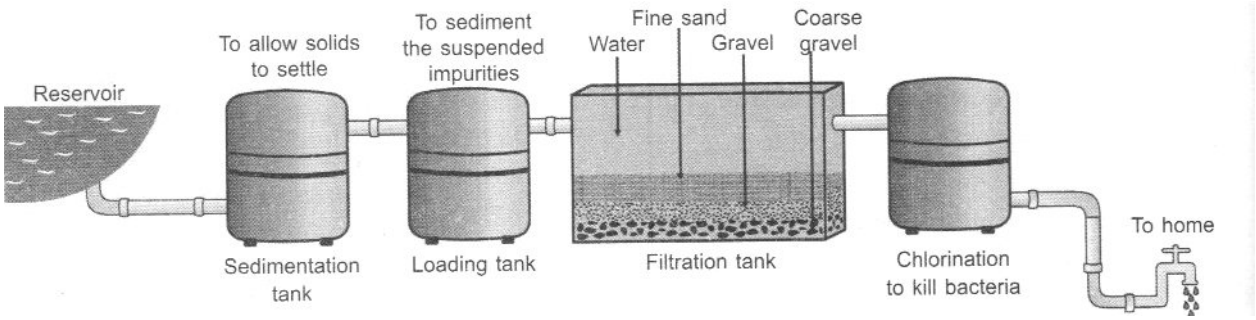
b) Lose heating because it can be reverses. It is a physical change.

c) It does not involve change in chemical properties.

d) Coffee can be obtained by evaporating water.

c) On cooling we will get vinegar back

108. Show diagrammatically how water is purified in the water works system and list the process involved



Process i) Sedimentation ii) Loading iii) Filtration iv) Chlorination

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