LET US RECAPITUALTE

• A pure substance is a single substance (or matter) which cannot be separated into other kinds of matter by any physical process.

• Single elements and single compounds are regarded as pure substances.

- A mixture is not a pure substance.
- Hydrogen and helium are the major constituents of universe.
- Oxygen is the most abundant element in earth's crust.
- No two elements can have the same symbols.

• Chemical compounds are formed as a result of chemical combination between the atoms.

• Purity of gold is expressed in terms of carats. Pure gold is 24 carats.

• In a homogeneous mixture, the combining substances or constituents are uniformly mixed throughout.

- In a heterogeneous mixture, these are not.
- Homogeneous mixtures are also regarded as solutions.

• A binary solution consists of two components called solute and solvent.

• A solution having the maximum amount of solute dissolved in it at a given temperature is known as saturated solution.

• A saturated solution generally becomes unsaturated upon heating.

• Solubility of a solution is always expressed with respect to a saturated solution.

• Solubility is the maximum amount of solute dissolved in 100g of the solvent to form a saturated solution at a given temperature.

• Solubility of salts in water generally increases with rise in

temperature but in some cases, it decreases.

• Colloidal solutions and suspensions both represent heterogeneous mixtures.

• Dispersed phase particles in a colloidal solution follow zigzag path known as Brownian Movement.

• Tyndall effect is shown by colloidal solutions.

• The stability of the colloidal solutions is because of the charge on the colloidal particles.

• Separation of constituents from a heterogeneous mixture is easier as compared to homogeneous mixture.

• Centrifugation helps in the formation of a precipitate or residue.

• Two immiscible liquids can be easily separated with the help of separating funnel.

• Two miscible liquids differing in their boiling points by at least about 25° can be separated by fractional distillation.

• Simple distillation helps in purifying an impure liquid containing non-volatile impurities.

• Paper chromatography helps in separating components present in homogeneous mixture even if f available in small amount.

• Physical change can be easily reversed while chemical change cannot be.

• Chemical reactions always occur in chemical changes.

N.C.E.R.T. IN TEXT PROBLEMS

1

Q.1. What is meant by a pure substance ?

Ans. In terms of science, a pure substance may be defined as a single substance or matter which cannot be separated into other kinds of matter by any physical process. All pure elements and compounds are pure substances. For details,

consult text part.

Q.2. List points of differences between homogeneous and heterogenous mixtures.

Ans.

Homogeneous mixture Heterogenous mixture

1. The constituents present	1. The constituents may
are uniformly mixed and	not be uniformly mixed
have no boundaries	and have clear boundaries
separation.	of separation.
2. The constituents cannot be	2. The constituents can
easily separation.	be easily seen.
3. The constituents cannot be	3. The constituents can
ea separated. Special methods	be easily separated.
are nee for the purpose.	Example. Mixture of iron
Example. Air is an	filings and powdered
example homogeneous	sulphur is an example of
mixture.	heterogeneous mixture.

Q. 3. How are sol, solutions and suspension different from each other ? Ans. Consult text-part.

Q. 4. 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 common salt = 36 g

Mass of water = 100 g

Concentration of solution $= \frac{\text{Mass of solute}}{\text{Mass ot solvent}} \times 100$

$$=\frac{(36 \text{ g})}{(100 \text{ g})} \times 100$$

= 36 %

Q.5. How will you separate a mixture containing kerosene and petrol (difference in their boiling points is more than 25°C) which are miscible with each other ?

Ans. The separation can be done by applying process of simple distillation. For details, consult text part.

Q.6. Name the technique to separate

(i) butter from curd

(ii) salt from sea water

(iii) camphor from salt

Ans. (i) The separation can be done by carrying centrifugation in a centrifugation machine.

(ii) The separation can be done either by

crystallisation or by evaporation.

(iii) The process of sublimation will help in separating camphor from salt. Camphor will undergo sublimation.

Q.7. what types of mixture can be separated by technique known as crystallisation ?

Ans. The solid miktures in which one component or impurity is less soluble in a particular solvent as compared to the other. For example, impure samples of copper sulphate, potassium nitrate, potash alum etc. can be purified by this method. For details, consult text part. **y**

Q.8. Classify the following into physical and chemical changes.

(i) Cutting of trees
(ii) Melting of butter in a pan
(iii) Rusting of almirah
(iv) Boiling of water to form steam
(v) Passing of electric current through water and the water breaking down into hydrogen and oxygen gases
(vi) Dissolving common salt in water.
(vii) Making of fruit salads with raw fruits
(viii) Burning of paper and wood
Ans. Please note that a change which can be easily

Ans. Please note that a change which can be easily reversed is a physical change while the one which cannot be revpasted is a chemical change in nature. Based on this concept, the changes that are listed may be classified as :^B

(i) Chemical change	(ii) Physical change
(iii) Chemical change	(iv) Physical change
(v) Chemical change	(vi) Physical change
(vii) Physical change	(viii) Chemical change.
^H	

^H

N.C.E.R.T. EXERCISE

Q.9. Which separation techniques will you apply for the separation of the following ?

(a) Sodium chloride from its solution in water.

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

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

(d) Different pigments from an extract of flower petals.

(e) Butter from curd.

(f) Oil from water.

(g) Tea leaves from tea.

(h) Iron pins from sand.

(i) Wheat grains from husk.

(j) Fine mud particles suspended in water.

Ans. (a) Evaporation : Water will evaporate leaving behind sodium chloride.

(b) Sublimation : Ammonium chloride will be collected as sublimate.

(c) Filtration : Pieces of metal can be separated by filtration.

(d) Chromatography : Pigments (coloured

components) from the extract of flower plants, can be

separated by chromatography.

(e) Centrifugation : Butter will get separated upon centrifugation.

(f) Separating runnel : Oil and water can be separated by the use of separating funnel.

(g) Filtration : Upon filtration through a sieve, tea leaves will be collected on the sieve.

(h) Magnetic separation : A magnet will attract iron pins and not sand particles.

(i) Sieving : Wheat grains from husk can be separated with the help of sieves.

(j) Sedimentation : As a result of sedimentation, mud particles will settle as precipitate. It can be separated later on by filtration.

Q.10. Write the steps you would use for making tea. Use the words-solution, solvent, solute, dissolve, soluble, insoluble, filtrate and residue.

Ans. Tea can be prepared in the following steps :

(i) Take approximately two to three cups of water (solvent) in a pan and heat it on a gas burner.

(ii) When water starts boiling, add desired amount of

milk and sugar (both are solutes).

(iii) Now, stir with a spoon. As a result, sugar will dissolve and milk will become miscible, with water. A solution will be formed.

(iv) Further boil the solution for sometime so that sugar may completely dissolve.

(v) Now add the required amount of tea leaves (solute) to the pan. Boil again and filter through a sieve. Tea will be collected as filtrate. Tea leaves will get collected on sieve as residue.

Q.11. 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	Temperature in K				
Dissolved	283	293	313	333	353
Potassium nitrate Sodium chloride	21 36	32 36	62 36	106 37	167 37
Potassium	35	36	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 grams 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 maximum solubility at this temperature ?

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

Ans. (a) At 313 K, in the saturated solution

Amount of potassium nitrate dissolved in 100 grams of water = 62 g

Amount of potassium nitrate dissolved in 50 grams of water

$$=(62g)\times\frac{(50g)}{(100g)}=31g$$

(b) When the saturated solution prepared at 353 K is cooled to room temperature (about 298 K) the solubility of potassium chloride in water will decrease. It will slowly start separating as a crystalline white residue at the bottom of the container.

(c) The solubility of the salt in a water is defined as :

the maximum amount of the salt which is dissolved in 100 g of water (or any other solvent) to form a saturated solution at a given temperature

In the light of this, at 293 K

Solubility of potassium nitrate = 32 g per 100g of water

Solubility of sodium chloride = 36 g per 100 g of water

Solubility of potassium chloride = 35 g per 100 g of water Solubility of ammonium chloride = 37 g per 100 g of water

Ammonium chloride has the maximum solubility (37g per

100 g of water) at 298 K

(d) With rise in temperature, the solubility of all the salts in water increases. This has been shown by the data given in the table. Similarly, when the temperature is decreased, the solubility of these salts in water will decrease.

Q.12. Explain the following, giving examples : (a) Saturated solution (b) Pure substance (c) Colloid (d)I Suspension. **Ans.** For answer, consult text-part.

0.13. Classify each of the following as a homogeneous or heterogeneous mixture : (b) Wood (a) Soda water (c) Air (d) Soil (e) Vinegar (f) Filtered tea.

Ans. Homogeneous mixture : Soda water, air, vinegar, filtered tea.

Heterogeneous mixture : wood, soil.

Air is a homogeneous mixture of different gases. However, if some dust or other particles be present, then air becames heterogeneous mixture.

Q.14. How would you confirm that the colourless liquid given to you is pure water ?

Ans. This can be confirmed by the following experiments.

(i) Filter the colourless liquid through a very fine filter paper. If no residue is left on the filter paper, this means that the liquid is pure water and has no suspended in purities present in it.

(ii) Evaporate the colourless liquid in a china dish or beaker. In case no residue is left, this means that it is pure water and has no dissolved impurities present in it.

(iii) Determine the boiling point of pure liquid. If it comes out to be nearly 373 K (100°C), this means that the pure liquid is water.

Q.15. Which of the following materials fall in the category of pure substances?

(a) Ice (b) Milk (c) Iron (d) Hydrochloric acid (e) Calcium oxide (f) Mercury (g) Brick (h) Wood (i) Air.

Ans. Pure substances in the given list of materials are

(a) Ice (compound) (c) Iron (element) (e) Calcium oxide (compound) (f) Mercury (element).

Both milk and hydrochloric acid are homogeneous mixtures. Please note that the acid is formed when the vapours of hydrogen chloride gas are passed through water.

Q.16. Identity the solutions among the following mixtures :

(a) Soil (b) Sea water (c) Air (d) Coal (e) Soda water.

Ans. By definition, a solution or homogeneous mixture is the mixture of two or more non-reacting substances present in a single phase. In the light of

this, the solutions among the following are : (b) Sea water (c) Air (e) Soda water.

Q.17. Which of the following will show "Tyndall effect"?

(a) Salt solution (b) Milk

(c) Copper sulphate solution (d) Starch sol. Ans. Tyndall effect is shown by colloidal sol. Since milk and starch sol are colloidal sol therefore, these will show Tyndall effect.

O.18. 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 (j) Carbon dioxide (m) Blood.

Ans. Elements : Sodium, Silver, Tin and Silicon Compounds : Calcium carbonate. Methane, Carbon dioxide.

Mixtures : Soil, Sugar solution, Coal (as percentage of carbon varies), Air, Blood, Soap.

Q.19. Which of the following are chemical changes

(a) Growth of a 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 a candle.

Ans. Chemical changes are : Growth of a plant. Rusting of iron, Cooking of food, Digestion of food. Burning of a candle.

CONCEPT BASED OUESTIONS

Q.20. The exact number of elements is known but not that of the compounds. Explain. Ans. Consult text-part.

Q.21. A freezing mixture is normally prepared by mixing some common salt with ice. Assign reason.

Ans. The freezing point of water (solid state) is 0°C (or 273 K). In many cases, the freezing point has to be lowered. It is generally achieved by mixing some common salt or some other salt with ice. This is known as a freezing mixture. Actually in ice, sodium chloride acts as the impurity. It is a fact that impurities always lower the freezing point temperature of a liquid.

Q.22. A mixture of ethyl alcohol and water is homogeneous while that of oil and water is heterogeneous. Explain.

Ans. Ethyl alcohol (or simply alcohol) combines with water to form a single phase only and there is no boundary of separation between alcohol and water. Therefore, the mixture is homogeneous in nature. Oil and water also combine to form a liquid mixture only. However, there is a boundary of separation between the two which means that oil and water form separate layers. Therefore, the mixture is heterogeneous and not homogeneous in nature.

Q.23. A compound is regarded as a pure substance while the mixture is not. Assign reason.

Ans. A compound is always a single substance in which two or more elements are combined chemically. A mixture as the name suggests, is a combination of elements or compounds or both. Thus, a compound fulfils the definition of a pure substance but not a mixture. Moreover, a compound

has a sharp melting or boiling point while a mixture does not have.

Q.24. Two gases ammonia and hydrogen chloride present in separate tubes are mixed together. Have they resulted in a mixture ?

Ans. No, they have not resulted in a mixture because they have combined with each other to form ammonium chloride which is a new substance. A mixture is always formed by mixing non-reacting substances.

Ammonia (gas) + Hydrogen chloride (gas) \rightarrow Ammonium chloride (solid).

Q.25. All mixtures are homogeneous. Is this statement correct ? Justify your answer.

Ans. No, this statement is wrong. Mixtures can be homogeneous only if the constituents present are uniformly mixed and there is no boundary of separation of these constituents. For more details, consult text part.

Q.26. How can a saturated solution be made unsaturated ?

Ans. A saturated solution can be made unsaturated in two ways :

(a) By increasing the temperature or by heating

(b) By adding more of the solvent or by diluting the solution.

Q.27. The solubility of a sodium in water increases with rise in temperature while that of lithium carbonate decreases. Assign reason.

Ans. When sodium chloride is dissolved in water, the process is endothermic in nature. This means that heat energy is absorbed in the process. Therefore, solubility increases with rise in the temperature. In case of lithium carbonate, the process of dissolution is exothermic. This means that heat is evolved in the process. Therefore, its solubility in water decreases with rise in temperature.

Q.28. Colloidal solutions show Tyndall effect but true solutions do not- Discuss.

Ans. In a colloidal solution, the particle size is such (1 nm to 100 nm), that these particles scatter the light rays as they fall on them. Because of scattering, the path of the light as well as the particles become visible. But in a true solution, the particle size is so small (less than 1 nm) that these particles are not in a position to scatter the light. Therefore, true solution does not show any Tyndall effect.

Q.29. Bleeding from a fresh cut can be stopped by applying alum. Explain.

Ans. For answer, consult text part.

Q.30. Explain how does soap help in cleaning dirty clothes ?

Ans. In dirty clothes, the dust particles are present on oil drops sticking to them. Simple water cannot remove these oil drops from the clothes because water and oil as such do not form a stable emulsion. Soap plays the role of emulsifier and helps in forming a stable emulsion between the two. This means that soap helps in removing these oil drops along with the dirt sticking to them. The dirty clothes get washed by soap solution.

Q.31. Fog and cloud are both colloidal in nature. How do they differ ?

Ans. Both fog and cloud are the examples in which liquid is the dispersed phase and gas (air) is the dispersion medium. The only difference between them is that clouds are formed in the upper atmosphere while fog gets formed in the region close to earth.

Q.32. What is the function column in fractional distillation ?

Ans. A fractionating column obstructs the upwards movement of the vapours of the liquids. As a result, the energy (latent heat of fusion) which is released by the high boiling liquid is taken by the low boiling liquid. It remains in the vapour state. The high boiling liquid by releasing energy condenses and falls back in the distillation flask. Thus, fractionating column helps in the

separation of the components from a mixture.

Q.33. Two liquids differing in the boiling point by at least 20° present in a mixture can be separated by

fractional distillation. Explain.

Ans. In case the difference in boiling point is less than 20°, the vapours of high boiling liquid will also get condensed along with the low boiling liquid. Their separation from each other will be quite difficult.

Q.34. Water containing 88.8% oxygen and 11.2% hydrogen is often used as a fire extinguisher. Can a mixture containing the two gases in the same ratio by mass be used for extinguishing fire ?

Ans. No, it will not happen. Actually, in water the two elements are chemically combined with each other. They therefore, lose their identity. But in the mixture, no chemical combination between hydrogen and oxygen has taken place. Even water cannot be formed on mixing the gases. Therefore, the mixture will not extinguish any fire.

Q.35. The melting point of a solid when determined experimentally comes out to be 160°C. But its actual melting point as given in standard books is 150°C. Predict the nature of the solid.

Ans. Since the experimentally determined melting point of the solid is more than the standard value of the melting point, this means that the solid is not in pure state. It has some impurities present. Please note that the purity of a solid can be determined by finding its melting point and comparing it with the standard value.

VERY SHORT ANSWER QUESTIONS

Q.36. A shining thick liquid is often used in glass thermometers. Name it.

Ans. The shining liquid is mercury. It is used in glass thermometers as it does not stick to glass.

Q.37. Name two metals which are both malleable and ductile.

Ans. Copper and silver are both malleable and ductile.

Q.38. A diamond knife is quite often used for cutting glass. Why ?

Ans. Diamond is probably the hardest substance known. Therefore, a knife made from a special type of diamond is used for cutting glass.

Q.39. Is fresh air which we breathe in, a pure substance in terms of science ?

Ans. No, it is not a pure substance and is a mixture of several substances (e.g., nitrogen, oxygen, carbon

dioxide, water vapours etc.)

Q.40. How will check the purity of a pure chemical compound ?

Ans. The purity of a pure chemical compound can be

checked by finding its melting point experimentally and by comparing it with its standard melting point value available in the form of tables. In case, the two values are nearly the same, the substance is pure. Otherwise, it is not.

Q.41. A hard substance when bent produces a tinkling .sound. Predict its nature.

Ans. The hard substance is a metal. Actually metals are sonorous and produce tinkling sound when bent.

Q.42. Give one test to show that brass is a mixture

and not a compound.

Ans. When we try to melt brass, it does not have a sharp melting point. This shows that it is not a compound. It is a homogeneous mixture of copper and zinc and is called alloy.

Q.43. To the already prepared solution of a 'solute A' prepared in water, a. small amount of 'A' is added. However, it does not dissolve. What does it indicate.

Ans. This indicates that the solution of the substance 'A' in water is of saturated nature. It is called saturated solution.

Q.44. Classify the following as homogeneous and heterogeneous mixtures :

(a) Copper sulphate solution

(b) A suspension of chalk in water

(c) Dust storm (d) A dilute of alcohol in water.

Ans. (a) homogeneous	(b) heterogeneous
(c) heterogeneous	(d) homogeneous.

Q.45. What is the range of the size of the particles of dispersed phase in a colloidal solution ?

Ans. It ranges from 1 nm (10^{-9} m) to 100 nm (10^{-7} m) .

Q.46. When a beam of light was passed through the solution of a substance 'A' dissolved in water, the path of light could he seen Predict the nature of the solution.

Ans. The solution of substance 'A' in water is colloidal solution. The colloidal particles scattered the light when it was passed through the solution due to Tyndall effect.

Q.47. What will happen if a colloidal solution of sulphur is centrifuged in a centrifugal machine for sometime.

Ans. The yellow precipitate of sulphur will settle at the bottom of the tube and the solution collected above the precipitate will be colourless.

Q.48. How will you justify that rusting of iron is a chemical change ?

Ans. The rust is a brown chemical compound known as hydrated ferric oxide $(Fe_2O_3.xH_2O)$. It can not be removed from the surface of the metal by any means. Formula of rust shows that iron has undergone a chemical change.

Q.49. predict what might have happened if nitrogen was absent from air.

Ans. The role of nitrogen in air is to dilute the combustion effect of oxygen since nitrogen does not support combustion. Had nitrogen been absent, the combustion once started would never stop, You can well imagine as to what might have happened to us.

Q.50. Why do not the dispersed phases particles in a colloidal solution combine with one other ?

Ans. They do not come closer because of the presence of either positive or negative charge on them. Due to mutual repulsion, these particles remain scattered in a colloidal solution.

Q.51. What are the units of mass percent ?

Ans. Mass percent has no units as it is simply a ratio. **Q.52.** What is the nature the solution formed by mixing mustard oil and water ?

Ans. It is a colloidal solution known as emulsion.

Q.53. Given one example of the colloidal solution in which solid acts as the dispersed phase and gas as the dispersion medium.

Ans. Dust storm in which solid particles are dispersed in air.

SHORT ANSWER QUESTIONS

Q.54. Can a mixture of alcohol and water be separate with the help of a separating funnel ?

Ans. No, it is not possible because alcohol (ethyl alcohol) and water are completely miscible. They do not form separate layers. Therefore, their separation cannot be done with the help of a separating funnal.

Q.55. Sodium chloride contains two elements, but it is still a pure substance. Assign reason.

Ans. The two elements sodium and clorine have combined with each other by chemical reaction to form sodium chloride (NaCI) which is a chemical compound. Since these elements cannot be separated from each other by any physical process, sodium chloride is a pure substance.

Q.56. Alloys are sometimes called substitutional solid solutions. Explain.

Ans. Alloys are the homogeneous mixtures of two or

more metals. For example, brass is a mixture of copper and zinc. Actually, copper is a crystalline solid in which the atoms are closely packed to form a crystal lattice. Some of these atoms have been replaced or substituted by atoms of zinc. Therefore, brass is regarded as a substitutional solid solution.

Q.57. The particles in a colloidal solution follow a zig-zag path. Explain.

Ans. For answer, consult text part.

Q.58. What types of mixtures are represented by the following ?

(a) Carbon dioxide gas dissolved in water.

(b) Air containing suspended particles.

(c) Soap bubbles formed by blowing air into soap solution.

Ans. (a) homogeneous (b) heterogeneous (c) heterogeneous

Q.59. The miscible liquids A and B are present in a solution. The boiling point of A is 60°C while that of B is 90°C Suggest a method to separate them.

Ans. The separation can be done by the process of simple distillation. The vapours of the liquid A will rise in the flask when heated to a temperature of 60°C. They will pass through the condenser and will collect as distillate. The liquid B with higher boiling point will remain in the flask.

Q.60. Stale line property in which a solution of sugar in water resembles a mixture of sugar and sand and one property in which it differs from it.

Ans. Resemblance : Both of them taste sweet due to the presence of sugar.

Difference : The constituent particles cannot be seen in mixture of sugar and water but they can be easily seen in the mixture of sugar and sand.

Q.61. You are given two liquids; one a solution and the other a compound. How will you distinguish the

solution from a compound ?

Ans. Try to separate the constituents present in both by some suitable physical method. Separation is possible in case of a solution but not in a compound.

LONG ANSWER QUESTIONS

Q.62. Explain why water is a compound and not a mixture.

Ans. For answer, consult text part.

Q.63. Give three advantages of the chromatography technique.

Ans. (i) It requires a very small amount of the sample. (ii) The constituents present in the sample retain their individual characteristics during the process.

(iii) It can be used even if the constitutents have similar chemical properties.

Q.64. Give the main points of distinction between true solution, colloidal solution and suspension. **Ans.** For answer, consult text part.

Q.65. Discuss briefly the important applications of colloidal solution.

Ans. For answer consult text part.

HINGHER ORDER THINKING QUESTIONS

Q.66. Complete the following based on separation techniques. The first one is done for you.

Туре		Separation	Principle
Technic	que		
Home	ogeneou	us Fractional 1	Difference
distila	ation	in boiling	points
-	-	-	
		d	isulphide
	-	-	
		+	water
-		-	-
	Type Technic Homo distila -	Type Technique Homogeneou distilation 	Type Separation Technique Homogeneous Fractional I distilation in boiling d +

Ans. 2. Homogeneous, Evaporation, Difference in physical states

3. Heterogeneous Filtration, Difference in solubility in water

4. Homogeneous Chromatography Difference in adsortum of different components.

Q.67. The table given below shows how many grams of five different solids dissolve in 10 g of the solvents : water, alcohol and chloroform (all at 20°C).

Solvent	Salt	Suga	r Iodine	Chalk	urea
Water	36.0	204.0	0.6 0.0	100.0	
Alcohol	0.0	0.0	20.0	0.0	16.0
Chlorofo	rm 0.0	0.	0 3.0	0.0	0.0
(a) Wh	ich sol	id diss	olves best i	in water a	at 20°C ?

(b) Which solid is maximum soluble in alcohol ?
(c) Which solid is insoluble in all three solvents ?
Ans. (a) Sugar is best soluble in water at 20°C

(b) Iodine is maximum soluble in alcohol.

(c) Chalk is insoluble in all the three solvents.

Q.68. Some solids dissolve easily while the others do not

(a) What is the name given to the liquids which dissolve solids ?

(b) What is the name given to the clear liquid formed when a solid dissolves in a liquid ?(c) What is the name given to the liquid which

contains in it some suspended particles ?

Ans. (a) The liquids are known as solvents

- (b) The clear liquid is called solution or true solution.
- (c) The liquid is known as suspension.

Q.69. Butter is an example of one type of colloidal solution. Name it. Give a reason for your choice.

Ans. The colloidal solution is an example in which solid acts as the dispersion medium while liquid as the dispersed phase. It is also called gel.

Reason for the choice. fur the choice. On pressing butter, liquid drops come out of it leaving behind a solid. This clearly shows that butter is a gel.

MULTIPLE CHOICE QUESTIOS

Select the correct answer : (d) solid dispersed in a liquid **MCOs Based on Text Part** 1. The major constituents of universe are : (a) hydrogen and helium (b) hydrogen and oxygen 13. The cause of Brownian movement is : (c) nitrogen and oxygen (d) helium and neon. (a) heat changes in liquid state (b) convection currents (c) impact of molecules of dispersion medium on 2. The most abundant element in earth's crust is : (a) carbon (b) silicon (c) nitrogen (d) oxygen. colloidal particles (d) attractive forces between the particles of dispersed **3.** Which of the following is a metalloid ? phase and dispersion medium. (a) phosphorus (b) nitrogen (c) bismuth (d) lead. 14. A mixture of ammonium chloride and sodium chloride can be separated by : 4. Presence of impurities : (a) crystallisation (b) hand pricking (a) lowers the melting point of solid (c) by sublimation (d) centrifugation. (b) increases the freezing point of liquid (c) increases the boiling point of liquid 15. Which of the following is not a chemical change. (d) lowers the boiling point of liquid. (a) rusting of iron (b) cooking of food (c) freezing of water (d) digestion of food. 5. The element which is a liquid slightly above 30° C is : 16. Which of the following will show Tyndall effect ? (a) cesium (b) lithium (c) magnesium (d) sodium. (a) starch solution (b) sodium chloride solution 6. Gold of which purity is normally used in making (c) copper sulphate solution (d) sugar solution. ornaments ? (a) 20 carat (b) 22 carat (c) 24 carat (d) 18 carat. 17. Size of particles in a colloidal solution ranges 7. Which out of the following is a heterogeneous mixture from : (b) 10^{-6} cm to 10^{-7} cm (a) 10^{-6} cm to 10^{-3} cm (a) air (b) brass (c) iodised table salt (d) steel. (c) 10^{-2} cm to 10^{-4} cm (d) None is correct. 18. An emulsion is a colloidal solution formed by 8. Which of the following is not a compound ? mixing : (a) marble (b) washing soda (c) quick lime (d) brass. (a) two miscible liquids (b) any two liquids (c) any two gases (d) two immiscible liquids. 9. Carbon bums in oxygen to form carbon dioxide. The properties of carbon dioxide are : 19. Colloidal particles can be normally seen by : (a) similar to carbon (b) similar to oxygen (a) naked eve (b) ordinary microscope (c) totally different from both carbon and oxygen (c) electron microscope (d) telescope. (d) much similar to both carbon and oxygen. **20.** A pure substance can be : 10. Size of colloidal particles in a solution is : (a) an element only (a) more than 100 nm (b) a compound only (b) less than 1 nm (c) either element or compound (c) between 100 to 1000 nm (d) any substance. (d) between 1 to 100 nm, 21. At room temperature, a non-metal which is a 11. When a beam of light is passed through a colloidal liquid is : (a) sulphur (b) bromine (c) chlorine (d) nitrogen. solution, it gets : (a) reflected (b) absorbed (c) scattered (d) refracted. 22. In which of the following, dispersel phase is a **12.** Cloud is an example of: liquid and dispersion medium is a gas?

(a) cloud (b) smoke (c) gel (d) soap bubble.

MCQs BASED PRACTICAL SKILLS

(a) solid dispersed in a gas

(b) liquid dispersed in a gas(c) liquid dispersed in a solid

23. A small amount of the sample of a soil was mixed with water in a beaker. After stirring for sometime, the beaker was allowed to stand. The mud was found to settle down. The liquid above the mud was carefully filtered. The filtrate will be ;

- (a) a true solution
- (b) a colloidal solution
- (c) can be a true solution or a colloidal solution
- (d) a suspension

24. Which of the following upon shaking with water will not form a true solution ?

(a) Alum (b) Common salt (c) Albumin (d) Sucrose

25. Water was taken in four beakers labelled as I to IV.To these beakers, the following! substances were added.Beaker (I) common saltBeaker (II) AlumBeaker (III) Potassium nitrateBeaker (IV) A few drops of barium chloride and a fewdropsofdilute H_2SO_4 .

After sometime, the contents of the beakers were filtered. The contents of which beaker will leave residue on the filter paper.

(a) Beaker (I)	(b) Beaker (II)
(c) Beaker (III)	(d) Beaker (IV)

26. A student mixed a small amount of iron filings and sulphur powder in a dish. He could not affect the separation by simple hand pricking. Which liquid will you suggest to affect the separation ?

(a) carbon disulphide (b) cold water

(c) boiling water (d) kerosene

27. Which of the following will be a heterogeneous mixture ?

(a) common salt and water (b) cane sugar and water(c) Alum and water(d) Albumin and water.

ANSWERS

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

HINTS & EXPLANATIONS

- **1.** (a) Hydrogen and helium.
- **2.** (d) Oxygen (46.1%).
- **3.** (c) Bismuth is a metalloid.
- **4.** (c) is the correct answer.

5. (a) Slightly above 30°C, cesium is a liquid.

- 6. (b) 22 carat gold is used in making ornaments. It either
- contains copper or silver as impurities.
- 7. (c) is the correct answer.
- 8. (d) Brass is a mixture of copper and zinc (alloy).
- **9.** (c) is the correct answer.
- **10.** (d) is the correct answer.

11. (c) Beam of light is scattered and the

- phenomenon is called Tyndall effect.
- **12.** (b) is the correct answer.
- **13.** (c) is the correct answer.
- **14.** (c) is the correct answer.

15. (c) Freezing of water is a physical change.

16. (a) Starch solution because it is a colloidal

solution.

17. (b) It is between 10^{-5} cm (10^{-7} m) to 10^{-7} cm (10^{-9} m).

- **18.** (d) Emulsion is a mixture of two immiscible liquids.
- 19. (b) Ordinary microscope is used to view colloidal

particles.

20. (c) It can be either an element or a compound.

21. (b) Bromine (Br_2) is a liquid at room

temperature.

22. (a) In cloud, water drops are suspended in air.

23. (b) The filtrate will contain some mud particles and will be a colloidal solution

24. (d) Albumin will not form a true solution. It will form a colloidal solution

25. (d) A white residue of barium sulphate will appear in beaker (iv)

 $BaCI_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCI$

(White residue)

26. (a) Carbon disulphide will dissolve sulphur and not iron filings

27. (d) Albumin and water will form heterogeneous mixture.

TEST YOUR KNOWLEADGE

Very Short Answer Questions

- **1.** Is sugar a pure or impure substance ?
- 2. What is the size of solute particles in a true solution ?
- 3. Is colloidal solution homogeneous in nature ?

4. Give one example of suspension and colloidal solution.

5. Suggest two ways to separate a mixture of iron filings and sulphur.

6. What do we name the zig-zag motion of particles in a colloidal solution ?

7. Which of the following will show Tyndall effect ?

(a) Sodium chloride solution

(b) Starch solution

(d) Brass.

8. What happens when electric current is passed in a colloidal solution ?

9. What will happen if a beam of light is passed through a colloidal solution ?

10. Define solubility of a solution.

11. What happens to a saturated solution if heated?

12. Write two characteristics of colloidal solution.

13. How will you test the purity of a sample of sea water ?14. How will you separate small pieces of metals from engine oil ?

15. Identify the solutions among the following :

(a) Air (b) Sea water (c) Starch solution (d) Milk.

SHORT ANSWER QUESTIONS

26. What is the main difference between a true solution and a colloidal solution ? Give one example of both of them.

27. Compare the particle sizes in a true solution, colloidal solution and suspension.

28. Why cannot you separate a mixture of alcohol and water by simple distillation ?

29. Discuss the role of centrifugation in removing the precipitate formed in a solution.

30. How will you justify that the formation of water from hydrogen and oxygen is a chemical change and not a physical change ?

31. 4 g of a solute are dissolved in 36 g of water. What is the mass percent of the solution ?

32. Is the mass percent of a solution same as its strength ? Justify your answer.

33. What is solubility of a salt ? Discuss the effect of temperature on the solubility of sodium chloride m water.

16. Define mass percent.

17. 5 g of sodium chloride are dissolved 100 g of water to form a solution. Is this solution saturated in nature ?

18. Does freezing of ice represent a physical change?

19. Name two solvents other than water.

20. What type of colloidal solution is milk ?

21. Can we regard milk as a pure substance ?

22. What is the nature of sugar solution prepared in water ?

23. How can a saturated solution by made unsaturated ?

24. Does air represent a colloidal solution ?

25. What is the nature of blood ?

34. Mention the following statements whether true or false ;

(i) The separation of constituents from

homogeneous mixture is easier as compared to heterogeneous mixture.

(ii) True solutions also show Tyndall effect.

(iii) Brass is a solution while gun powder is not.

(iv) Alcohol and water can be separated by fractional distillation

(v) An emulsion becomes stable in the presence of an emulsifier.

(vi) A chemical change can be easily reversed.

(vii) Air represents a solution in terms of science.

35. 60% solution of alcohol has a volume of 70 mL. What is the volume of pure alcohol in the solution ?

LONG ANSWER QUESTIONS

36. How will you purify an impure sample of copper sulphate containing some suspended impurities m it ?

37. Give the main points of distinction in true solution, colloidal solution and suspension.

38. What is Tyndall effect ? How does it help in noticing the particles present in a colloidal solution.

39. You are given a mixture of methyl alcohol and acetone. Suggest a method for its separation.

40. What are physical and chemical changes ? How

will you distinguish between them ?

41. A mixture whether homogeneous or

heterogeneous cannot be a pure substance. Explain.

42. Give one example of the following solutions :

(i) Solid dissolved in liquid (ii) Solid dissolved in solid (iii) Liquid dissolved in liquid (iv) Gas dissolved in liquid.

43. A mixture of alcohol and water is called a true solution while that of mustard oil and water is known I as emulsion. How will you account for it ?

The End