IIT & AIIMS Foundation Course Chemistry

EXERCISE

Multiple Choice Questions

1 Which of the following would be described as impure?
(a) Crystallized salt (b) Salt solution
(c) Rock salt (d) All of the above.

2 If the component of the substance can be separated by a chemical change only then it is
(a) element (b) compound
(c) mixture (d) none of these.

3. Water is a compound because
(a) it exists as a solid, liquid or gas
(b) it cannot be split up
(c) it contains two different elements joined by chemical bonds
(d) it has 3 elements.

4. Mixtures always have
(a) definite composition
(b) invariable composition
(c) variable composition
(d) none of the above.

5. The zig-zag movement of dispersed phase particle in a colloidal system is known as
(a) Brownian motion
(b) transitional motion
(c) circular motion (d) linear motion.

6. Iodized common salt is
(a) homogeneous mixture
(b) heterogeneous mixture
(c) pure substance
(d) oxidized substance.

7. The concentration of a solution indicates
(a) the quantity of the solute present in solution
(b) the quantity of the impurities present in a solution
(c) the quantity of the solvent present in a solution
(d) the total quantity of solution.

8. In sweetened tea, the sugar is
(a) solvent (b) solute
(c) solution (d) none of these

9. A solution that has dissolved as much solute as it is capable of dissolving at a given temperature is
(a) only solution
(b) unsaturated solution
(c) saturated solution
(d) concentrated solution.

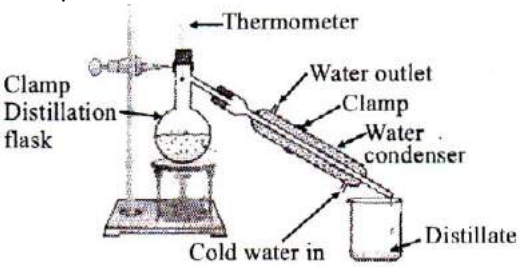
10. Pigments of natural colors can be separated
(a) By chromatography (b) centrifugation
(c) filtration (d) sublimation.

11. The fine particles of an insoluble substance uniformly dispersed throughout a gas or liquid is called
(a) suspension (b) precipitate
(c) colloidal solution (d) impurity.

12. What kind of solution is gel?
(a) Colloid (b) Mixture
(c) Emulsion (d) Suspension.

13. What will happen when a solute is added to a saturated solution?
(a) The solution will freeze
(b) The solution will become less concentrated
(c) A precipitate will form
(d) Concentration will increase.

14. While using the given apparatus, what must be kept in mind?



(a) The mixture in the distillation flask must contain a solid.
(b) The temperature difference between the boiling point of components of the mixture must be less then $25^{o}C$.
(c) The temperature difference between the boiling points of components of the mixture must be more than $25^{o}C$.
(d) All of these.

15. A small amount of the sample of a soil was mixed with water in beaker. After stirring for some time, 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.

16. Which of the following upon shaking with water will not form a true solution?
(a) Alum (b) Common salt
(c) Albumin (d) Sucrose. .

17. Water was taken in four beakers labeled as to IV. To these beakers the following substances were added.
Beaker (I) Common salt
Beaker (II) Alum
Beaker (III) Potassium nitrate
Beaker (IV) A few drops of barium chloride and a few drops of dilute 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).

18. A student mixed a small amount of iron filings and sulphur powder in a dish. He could not affect the separation by simple hand picking. Which liquid will you suggest to effect the separation?
(a) Carbon disulphide (b) Cold water
(c) Boiling water (d) Kerosene.

19. Which of the following will show Tyndall effect?
(a) Starch solution
(b) Sodium chloride solution
(c) Copper sulphate solution
(d) Sugar solution

20. An emulsion is a colloidal solution formed by mixing
(a) two miscible liquids
(b) any two liquids
(c) any two gases
(d) two immiscible liquids.

21. The size of colloidal solution is in the range of
(a) $1-100\,nm$ (b) $100-1000\ nm$
(c) $10^{-5}\,m-10^{-7}\,m$ (d) $10^{7}-10^{9}\,m$

22. Brass contains
(a) gold and copper (b) copper and zinc
(c) zinc and silver (d) copper and silver.

23. Which of the following is NOT a colloid?
(a) Sugar syrup (b) Fog
(c) Milk (d) Cheese

24. A liquid non-metal, amongst the following is
(a) bromine (b) mercury
(c) phosphorus (d) both (a) and (b)

25. Which of the following is a homogeneous mixture?
(a) Solution of sugar in water
(b) Chalk powder in water
(c) Kerosene oil in water
(d) None of these

26. A mixture of common salt, sulphur, and iron filings is shaken with carbon disulphide and filtered through a filter paper. The filtrate is evaporated to dryness in a china dish. What will be left in the dish after evaporation?
(a) Sand (b) Sulphur
(c) Iron filings (d) Common salt

27. A mixture of sulphur and iron filings is heated strongly to obtain a residue. Which of the following is not a characteristic property of the residue?
(a) It can be separated into sulphur and iron filings by physical methods
(b) Its composition does not change from one part to another.
(c) Its properties are entirely different from those of sulphur and iron filings.
(d) Its appearance is different from those of sulphur and iron filings.

28. Solutions with low concentrations of solutes are
(a) concentrated (b) dilute
(c) solvents (d) none of these.

29. Which of these is a mixture?
(a) Solution (b) Alloy
(c) Amalgam (d) All of these

30. Which of the following is always true when a substance undergoes a physical change?
(a) It changes colour
(b) A new substance is formed
(c) It boils
(d) Its composition remains the same

31. Which of the following statement is correct?
(a) A pure substance must contain only one type of atom.
(b) A mixture containing two compounds must be heterogeneous.
(c) A heterogeneous mixture must contain at least three elements.
(d) A homogeneous mixture must be uniform.

32. Which of the following is not an example of a physical change?
(a) Dissolving sugar in water
(b) Casting iron in moulds
(c) Setting of cement
(d) Magnetization of iron

33. Distillation involves all the following processes except
(a) change of state
(b) boiling
(c) condensation
(d) evaporation

34. Separation of petroleum into its components is done by
(a) chromatography
(b) sublimation
(c) distillation
(d) fractional distillation

35. Simple distillation can be best used to separate
(a) a mixture of benzene (boiling point $80^{o} C$)
(b) and toluene (boiling point $110^{o} C$)
(c) a mixture of ether (boiling point $35^{o} C$) and toluene (boiling point $110^{o} C$)a mixture of ethanol (boiling point $78^{o} C$)and water (boiling point $100^{o} C$)
(d) none of these.

36. Which method cannot be used for purification of liquids?
(a) Chromatography
(b) Distillation
(c) Sublimation
(d) Fractional distillation

37. A mixture contains four solid compounds A, B, C, D. On heating C changes to vapor state. C can be separated from rest of the solids by
(a) crystallization (b) sublimation
(c) distillation (d) filtration

38. A liquid is found to scatter a beam of light but leaves no residue when passed through the filter paper. The liquid is
(a) a suspension
(b) a true solution
(c) a colloidal sol (d) oil

39. Identify the false statement.
(a) colloids are homogeneous
(b) colloids show Tyndall effect
(c) colloids show Brownian movement
(d) The size of colloidal particles ranges between 1 - 100 nm.

40. Which is not an example of macromolecular colloids?
(a) Nylon (b) Plastics
(c) Rubber (d) Soaps

41. Which of the following is not a colloid?
(a) Foam (b) Cloud
(c) Roohafza syrup (d) Egg

42. Smoke is an example of
(a) gas dispersed in liquid
(b) gas dispersed in solid
(c) solid dispersed in gas
(d) solid dispersed in solid

43. Micelles are
(a) emulsion cum gel (b) associated colloids
(c) true solution (d) suspensions

44. Which one of the following is correct matched?
(a) Emulsion - curd (b) Foam - mist
(c) Aerosol – smoke (d) Solid sol - cake

45. For a colloidal solution, dispersion medium dispersed phase is liquid - liquid. This is example of
(a) emulsion (b) aerosol
(c) gel (d) sol

46. Suspensions are
(a) visible to naked eye
(b) invisible through microscope
(c) not visible by any means
(d) invisible under electron microscope.

47. Butter is a colloid formed when
(a) fat is dispersed in fat
(b) fat is dispersed in water
(c) water is dispersed in fat
(d) proteins dispersed in water

48. Which one is an example of Micelle system?
(a) Soap + water (b) Rubber + benzene
(c) Protein + water (d) Rubber + water

49. The cause of Brownian movement is
(a) heat change in liquid state
(b) convection current
(c) impact of molecules of dispersion medium on colloidal particles
(d) attractive forces between the particles

50. The number of phases in colloidal system are
(a) one (b) two
(c) three (d) four

51. If we heat iodine , then it is a
(a) physical change (b) chemical change
(c) no change (d) color change

52. Color of rust is
(a) blue (b) green
(c) reddish brown (d) white

53. Which of the following is not a chemical Change
(a) electrolysis of water
(b) boiling of water
(c) digestion of food
(d) burning of magnesium

54. Which of the following is a compound?
(a) Steel (b) Water
(c) Brass (d) Iodine

55. Tincture of iodine is a solution of iodine in
(a) water (b) acetone
(c) benzene (d) ethyl alcohol

56. Which gas present in air has the highest boiling point?
(a) Oxygen (b) Nitrogen
(c) Argon (d) Hydrogen

57. Which method is used to separate drugs from blood?
(a) Fractional distillation
(b) Crystallization
(c) Chromatography (d) Distillation

58. Which of the following involves both physical and chemical change?
(a) Burning of a candle (b) Rusting of iron
(c) Cooking of food (d) Boiling of water

59. The particles of a true solution are
(a) > 1 nm in diameter
(b) < 1 nm in diameter
(c) = 1 nm in diameter
(d) > or = 1 nm in diameter

60. Which of the following is the smallest part of a compound whose properties are the same as those of a compound?
(a) Atom (b) Molecule
(c) Mixture (c) Unit cell

61. What is the name of the insoluble substance which settles to the bottom of its container?
(a) Solute (b) Solvent
(c) Sediment (d) Slag

62. We can separate a pure solid from its solution by
(a) crystallization (b) simple distillation
(c) sedimentation (d) both (a) and (b)

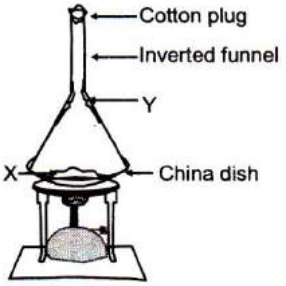
63. Boron, silicon, germanium are
(a) metals (b) non-metals
(c) metalloids (d) impurities

64. Which of the following statements is correct about non-metals?
(a) They have lustre.
(b) They make a ringing sound when hit.
(c) They are poor conductors of heat and electricity.
(d) They have shine.

65. In modern surgery, metal pins are used for holding the broken bones together. This pin is made of
(a) copper (b) stainless steel
(c) aluminum (d) none of these

66. Soda water is a solution of carbon dioxide in water. What is this solution composed of?
(a) Liquid solute in a gaseous solvent
(b) Gaseous solute in a liquid solvent
(c) Liquid solute in a liquid solvent
(d) Gas in suspended form in liquid

67. Identify X and Y in the given figure.



(a) $X =$ Mixture of naphthalene and anthracene $Y =$ Solid naphthalene
(b) $X =$ Mixture of $NaCl$ and water $Y =$ Solid $NaCl$
(c) $X =$ Mixture of $NaCl$ and anthracene $Y =$ Solid anthracene
(d) $X =$ Mixture of sugar and $NaCl$ $Y =$ Solid sugar

68. Which of the following is not true for a compound?
(a) It is heterogeneous in nature.
(b) A compound contains different elements in a fixed ratio.
(c) Properties of a compound are entirely different from those of the elements present in it.
(d) Constituents of a compound cannot be separated by simple physical methods.

69. Two substances A and B when brought together form a substance C with the evolution of heat. The properties of C are entirely different from those of A and B. The substance C is
(a) a compound (b) an element
(c) a mixture (d) none of the above

70. Purity of a solid substance can be checked by its characteristic
(a) boiling point
(b) melting point
(c) solubility in water
(d) solubility in a alcohol

71. Which of the following pairs does not contain both elements?
(a) Carbon, silicon (b) Helium, nitrogen
(c) Bronze, zinc (d) Copper, silver.

72. Solvent used in crystallization should
(a) not dissolve the impurities
(b) not react chemically with substance
(c) do not crystallize on cooling
(d) all of the above

73. Principle of chromatography is
(a) rate of absorption (b) rate of adsorption
(c) rate of diffusion (d) none of these.

74. Solvent used in chromatography is
(a) alcohol (b) water
(c) both (a) and (b) (d) ether

75. In chromatography different constituents of a mixture get adsorbed differently on same adsorbent because
(a) they have difference in pressure
(b) they have different rates of movement
(c) both (a) and (b)
(d) none of these

76. The gas which is added to water to kill germs is
(a) CO_2 (b) Cl_2
(c) O_2 (d) H_2

77. To supply drinking water in a city the water from a river is pumped by the pumping static into a large reservoir called
(a) sedimentation tank (b) loading tank
(c) filtration tank (d) chlorination tank

78. Which of the following is a non-aqueous solvent?
(a) Water (b) Chloroform
(c) Both (a) and (b) (c) None of the above

79. Super saturated solution contains
(a) amount of solute more than saturation level
(b) amount of solute less then saturation level
(c) amount of solute equal to saturation level
(d) no solute at all.

80. Identify the aqueous solution
(a) sugar dissolved in water
(b) sugar dissolved in alcohol
(c) iodine dissolved in ether
(d) sulphur dissolved in carbon disulphide

81. A 15% alcohol solution means
(a) 15 mL alcohol and 85 mL water
(b) 15 mL alcohol and 100 mL water
(c) 15 mL water and 85 mL alcohol
(d) 15 mL alcohol and 50 mL water

82. The solution which has two components is known as
(a) binary solution (b) true solution
(c) quaternary solution (d) aqueous solution

FILL IN THE BLANKS

1. In general, on decrease of temperature.....solution is converted into super saturated solution and on increase of temperature a saturated solution is converted in to.....

2. Heating of coal is considered as.....change.

3. Digestion of food is..... change.

4. Gases can be separated from air by.....method

5. 10% by mass of a solution means..... g of solute is present in 50 g of solution.

6. In an unsaturated solution more solute can be dissolved without increasing the amount of the

7. Oil and water do not mix easily. They are said to be..... .

8. Milk is an emulsion in which the dispersed phase is..... and the dispersion medium is..... .

9. Fog is a colloid consisting of..... in air.

10. Soap solution is a colloidal solution in which the dispersed phase is.....while the dispersion medium is..... .

11. The reaction between an aqueous solution of sodium chloride and silver nitrate is a..... change.

12. Milk is a..... solution while vinegar is a..... solution.

13. There is a difference in properties of a solution, colloid and suspension due to difference in

14. When a liquid is dispersed in other liquid, the colloid is termed as..... .

15. The zig - zag motion of colloidal particles is known as..... .

16. The colloidal dispersion of liquids in solid media are called .....

17. The sky looks blue due to..... effect.

18. Mixing of iron filings and sand is a.....change.

19. The properties of a compound differ from those of it's ..... .

20. Migration of colloidal particles under the influence of an electric field is known as.....

TRUE OR FALSE

1. Solution of copper sulphate will show Tyndall effect.

2. Immiscible liquids separate out in layers depending on the densities.

3. During burning of a candle, both physical and chemical changes take place.

4. Constituents of a mixture can be separated by physical methods.

5. Mixture of salt and ammonium chloride can be separated by crystallization process.

6. The colored components present in a dye can be separated by a process known as chromatography.

7. The particles of a colloid can pass through a filter paper.

8. Colloidal state is an intermediate state between suspension and true solution.

9. Mixtures are always combination of the same compounds that are in different states.

10. "Element" word was first used by Robert Boyle in 1661.

11. A true solution is a heterogeneous mixture.

12. Two or more miscible liquids can be separated by distillation.

13. Graphite is a good conductor of electricity.

14. Mixture of sand and sulphur can be separated by dissolving the mixture in water and filtering it.

15. Making of wine from grapes is a chemical change.

16. Drying of paint on a door is a physical change.

17. An element can be distinguished from its compounds by examination of its physical properties only.

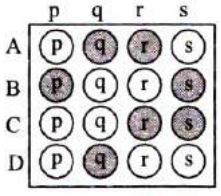
18. A chemical change is a permanent change and cannot be reversed by removing the cause of the change.

19. A homogeneous liquid which on boiling leaves a solid residue is a solution containing solid as solute.

20. Gold does not get rusted since it is a noble metal.

MATRIX MATCH TYPE

In this section, each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in Column-I have to be matched a with statements (p, q, r, s) in Column-II. The answers to these questions have to be appropriately bubbled as illustrated in the following example. If the correct matches are A-q, A-r, B-p, B-s, C-r, C-s and D-q, then the correctly bubbled matrix will look like as shown.



1.

Column I	**Column II**
(A) Fog	(p) Solid in gas
(B) Smoke	(q) Solid in solid
(C) Steel	(r) Solid in liquid
(D) Toothpaste	(s) Liquid in gas

2.

Column I	**Column II**
(A) Solution which can dissolve more solute	(p) Saturated solution
(B) Solution which has excess of solute	(q) True solution
(C) Solution which cannot dissolve any more solute	(r) Supersaturated solution
(D) Solution which has particle size 10"7 cm	(s) Unsaturated solution

3.

Column I	**Column II**
(A) Salt solution	(p) Suspension
(B) Blood	(q) Colloid
(C) Smoke	(r) True solution
(D) Chalk water	(s) Emulsion

4.

Column I	**Column II**
(A) Butter	(p) solvent hating
(B) Cheese	(q) Associated colloid
(C) Micelles	(r) Emulsion
(D) Lyophobic	(s) Gel

5.

Column I (Property)	**Column II (Application)**
(A) Tyndall effect	(p) Smoke precipitator
(B) Electrophoresis	(q) Sewage disposal
(C) Coagulation	(r) Cleansing action of soap
(D) Micelles	(s) Blue sky

6.

Column I	**Column II**
(A) A solution generally	(p) No units has
(B) A true solution is	(q) True solution
(C) The concentration of solution has	(r) two components
(D) Only one phase exists in	(s) Homogeneous in nature

7.

Column I	**Column II**
(A) Miscible liquids	(p) Distillation
(B) Immiscible liquids	(q) Crystallization
(C) Impure copper sulphate	(r) Sublimation
(D) Salt and ammonium chloride	(s) Funnel

8.

Column I	**Column II**
(A) Diamond	(p) Mixture

	(B) Iron	(q) Compound
	(C) Water	(r) Element
	(D) Gun powder	(s) Metal

9.

Column I	**Column II**
(A) Rusting of iron	(p) Physical as well as chemical change
(B) Melting of wax	(q) Chemical change
(C) Burning of candle	(r) Physical change
(D) Baking of cake	(s) No change

10.

Column I	**Column II**
(A) Aluminum	(p) Compound
(B) Fluorine	(q) Metal
(C) Tellurium	(r) Non-metal
(D) Lime stone	(s) Metalloid

ASSERTION & REASON QUESTIONS

Directions: In each of the following questions, a statement of Assertion (A) is given followed by a corresponding statement of Reason (R) just below it of the statements, mark the correct answer as

(a) If both assertion and reason are true and reason is the correct explanation of assertion

(b) If both assertion and reason are true but reason is not the correct explanation of assertion

(c) If assertion is true but reason is false

(d) If assertion is false but reason is true.

1. **Assertion:** In sublimation a substance Changes directly from solid to vapor without passing through liquid state and vice-versa.
Reason: Distillation involves two process i.e. vaporization and condensation.

2. **Assertion:** Impure benzoic add can be purified by sublimation.
Reason: Benzoic acid sublimes on heating.

3. **Assertion:** Colloidal solutions are stable and the colloidal particles do not settle down.
Reason: Brownian movement counters the force of gravity acting on colloidal particles.

4. **Assertion:** Chromatography can be used to separate a mixture of plant pigments.
Reason: Chromatography can be used to separate colored substances into individual components.

5. **Assertion:** A mixture of benzoic acid and naphthalene can be separated by crystallization from water.
Reason: Benzoic acid is soluble in hot water but naphthalene is in soluble in hot water.

6. **Assertion:** A mixture of sugar and benzoic acid can be separated by shaking with ether.
Reason: Sugar is insoluble in water.

7. **Assertion:** True solution exhibit Tyndall effect.
Reason: Particles are very small in size.

8. **Assertion:** When a beam of light is passed through a colloidal solution placed in a dark place the path of the beam becomes visible.
Reason: Light gets scattered by the colloidal particles.

9. **Assertion:** A solution of table salt in a glass of water is homogeneous.
Reason: A solution having different composition throughout is homogeneous.

10. **Assertion:** Lyophobic sols are less stable than lyophilic sols.
Reason: Lyophilic sols have solvent hating nature.

11. **Assertion:** If the dispersed phase is liquid and the dispersion medium is solid, the colloid formed is known as emulsion.
Reason: Whipped cream is an example of an emulsion.

12. **Assertion:** Tyndall effect is an optical property.
Reason: Electrophoresis is an electrical property.

13. **Assertion:** Boiling point determines the purity of solid compounds.
Reason: Melting point of a solid compounds which is pure is fixed.

14. **Assertion:** A mixture of acetone and methanol can be separated by fractional distillation.
Reason: The difference between their boiling points is very less.

15. **Assertion:** A mixture of camphor and ammonium chloride cannot be separated by sublimation.
Reason: Camphor on heating sublimes, ammonium chloride does not.