SECTION - I

Straight Objective Type

This section contains multiple choice questions. Each question has 4 choices (a), (b), (c), (d), out of which ONLY ONE is correct. Choose the correct option.

1. *The substance which is not a compound*

   (a) marble (b) limestone (c) diamond (d) chalk

2. *The substance that is not pure*

   (a) brass (b) copper wire

   (c) aluminium sheet (d) wrought iron

3. *The substance that breaks into simpler substances on simple heating*

   (a) Carbon (b) Sulphur

   (c) Phosphorus (d) Zinc carbonate

4. *The mixture that is not homogeneous*

   (a) Sugar solution (b) brine

   (c) soil (d) mountain air

5. *The substance that has only one kind of atom in it*

   (a) Marsh gas (b) dry ice (c) well water (d) ozone

6. *The method that can be used to separate a homogeneous mixture of two liquids*

   (a) Decantation (b) filtration

   (c) fractional crystallisation (d) fractional distillation

7. *Chromatography can be used to separate a mixture of /that is*

   (a) Solid - solid (b) complex mixture

   (c) liquid - gas (d) solid-liquid

8. *Fractional crystallization uses the difference in _____ of the components of a mixture.*

(a) Rates of diffusion (b) density

(c) Melting Point (d) solubility

9. The common element in all amalgams

(a) Iron (b) mercury (c) Copper (d) oxygen

10. An alloy is a homogeneous mixture of

(a) non- metals (b) inert gases

(c) metals (d) metalloids

11. Soda water is an example of a solution of

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

(c) liquid in gas (d) liquid in liquid

12. Cloud is an example of a solution of

(a) liquid in liquid (b) gas in gas

(c) liquid in gas (d) gas in liquid

13. Dry air is an example of a solution of

(a) gas in gas (b) gas in liquid

(c) liquid in gas (d) solid in liquid

14. Which is correct about solution?

(a) Solutions are homogeneous mixture

(b) solution formation is a physical process

(c) the constituent in larger proportion is called solvent

(d) all of these

15. Which is incorrect about solutions?

(a) solutions are heterogeneous mixtures

(b) solutions have define MP and BP

(c) the constituent can not be separated easily

(d) all of these

16. *A saturated solution can be converted to unsaturated by*

(a) increasing solvent quantity

(b) always by increasing temperature

(c) increasing solute quantity

(d) all of these

17. *A change in which a new substance is formed may be a*

i) physical change *ii) chemical change* *iii) nuclear reaction*

(a) i) only *(b) i) or ii)* *(c) ii) only* *(d) ii) or iii)*

18. *A change in which there is no change in chemical properties is:*

(a) physical change *(b) nuclear change*

(c) chemical change *(d) none of these*

19. *The principle of chromatography is:*

(a) liquid with lower boiling points boil off first

(b) state with lower solubility's crystallize out of saturated solution when cooled

(c) the rate of diffusion of liquid varies

(d) all liquids are not mixcible in water

20. *Air is a solution of*

(a) nitrogen in oxygen *(b) oxygen in nitrogen*

(c) CO_2 *in oxygen* *(d) inert gases in oxygen*

21. *Compounds can be broken into simpler substances by*

(a) heating *(b) nuclear fission*

(c) dissolution *(d) all three*

22. *The element, compound and mixture in the given list is: cobalt, ink, milk, marble, ozone*

(a) cobalt is an element, ink and milk are mixtures, ozone and marble are

compounds

(b) cobalt is an element, marble and milk are mixtures, ink and ozone are compounds

(c) cobalt and ozone are elements, ink is a mixture, marble and milk are compounds

(d) cobalt is an element, milk is a mixture, ink, marble and ozone are compounds.

23. *A mixture of sulphur dioxide (BP is* 10^0C *) and oxygen (BP is -* 183^0C *) can be separated economically by*

(a) cooling to BP of oxygen *(b) adsorbing the gases*

(c) cooling to BP of SO_2 *(d) reacting one of the gases*

24. *A mixture of* $NaNO_3$ *from its aqueous solution can be separated by*

(a) boiling *(b) fractional crystallization*

(c) chromatography *(d) decantation or filtration*

25. *A mixture of iodine and Sodium iodine can be separated by*

(a) fractional distillation *(b) sublimation*

(c) chromatography *(d) fractional crystallization*

SECTION - II

Assertion - Reason Questions

This section contains certain number of questions. Each question contains STATEMENT-1 (Assertion) and STATEMENT - 2 (Reason). Each question has 4 choices (a), (b), (c) and (d) out of which ONLY ONE is correct. Choose the correct option.

26. *STATEMENT - 2: The simple components of a mixture taken separately are impure.*

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct

explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

27. *STATEMENT-1: A compound is broken into simpler substances by chemical methods.*

because

STATEMENT - 2: A compound is made up of two or more elements combined chemically.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

28. *STATEMENT-1: Separation of mixtures is done by physical methods.*

because

STATEMENT - 2: Components of a mixture have different physical properties.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

29. *STATEMENT-1: A compound will have the properties of the elements presents in it.*

because

STATEMENT - 2: The elements in a compound are combined chemically.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

30. *STATEMENT-1: A concentrated solution need not be a saturated solution.*

because

STATEMENT - 2: Some salts have low solubility.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

31. *STATEMENT-1: The solubility of a gas in a increases kinetic energy of the solvent.*

because

STATEMENT - 2: Increase in temperature increases kinetic energy of the solvent.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

32. *STATEMENT-1: Weight Fraction, and Weight % are methods of expressing concentration that are unaffected by temperature.*

because

STATEMENT - 2: In both the methods, the weight are taken.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

33. *STATEMENT-1: Solubility of a substance depends entirely on the solvent.*

because

STATEMENT - 2: Likes dissolve likes.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

34. *STATEMENT-1: Rate of dissolution is dependent on agitation.*

because

STATEMENT - 2: Agitation removes saturated parts of solution and disperses it.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

35. *STATEMENT-1: Solubility Carbon Dioxide is a mixture of carbon and oxygen.*

because

STATEMENT - 2: A mixture has two or more substances mixed in a random way.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

36. *STATEMENT-1: Rainwater is a heterogeneous mixture.*

because

STATEMENT - 2: The composition of rainwater is not constant.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

37. *STATEMENT-1: Tyndall effect is not shown by copper sulphate solution*

because

STATEMENT - 2: Copper sulphate solution is a true solution.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

38. *STATEMENT-1: If the particle size of a component is more than* $10\,\text{Å}$ *in a mixture it will show Tyndall effect and Brownian Movement.*

because

STATEMENT - 2: True solutions do not show Tyndall effect or Brownial Movement.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

39. *STATEMENT-1: A super saturated solution is unstable.*

because

STATEMENT - 2: When a super saturated solution is disturbed by agitation the excess solute precipitates as crystals.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

40. *STATEMENT-1: Solubility and concentration are a measure of the same physical quantity.*

because

STATEMENT - 2: In a concentrated solution more solute is dissolved than in a dilute solution.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

SECTION - III

Linked Comprehension Type

This section contains paragraphs. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (a), (b), (c) and (d), out of which ONLY ONE is correct. Choose the correct option.

Paragraph for questions 41 to 44

A homogeneous mixture is a true solution in which the solute particle size is very small $-10\,\overset{0}{A}\left(1\overset{0}{A}=10^{-8}\,cm\right)$. *Due to this, solute particles cannot be seen with naked eye and they cannot be separated by filtration. Homogeneous mixture are clear and transparent. Heterogeneous mixtures can be classified into either colloids or suspension depending on the particle size. Colloids are solutions in which the solute particles size is between* $10\,\overset{0}{A}$ *and* $1000\,\overset{0}{A}$. *Suspensions are solutions in which the particles size is greater than* $1000\,\overset{0}{A}$. *Human beings can see particles whose size is greater than* $10\,\overset{0}{A}$. *Due to this particles in a colloid or suspension can be seen with naked eye. They can be separated by filtration. These solutions appear cloudy. Suspensions clear up to becomes transparent on standing as the heavier solute particles settle down at the bottom.*

41. *The order of solute particles size is*

(a) *true solution < suspension < colloid*

(b) *true solution > suspension > colloid*

(c) *true solution > colloid > suspension*

(d) *true solution < colloid < suspension*

42. *Filtration can be used if solute particles size is* _____

(a) *greater than* 10^{-7} *cm* (b) *equal to* $10\,\overset{0}{A}$

(c) *smaller than* $10\,\overset{0}{A}$ (d) *smaller than* $10^{-8}\,cm$

43. *A true solution can be separated into its components by*

(a) *evaporation* (b) *boiling*

(c) *Sedimentation* (d) *fractional distillation*

Paragraph for question 44 to 47

In chemistry, fractional crystallization is a method of refining substances based on differences in solubility. If two or more substances are dissolvent in a solvent, they will precipitate or crystallise out of solution at different rates. Crystallization can be induced by changes in concentration, temperature or other means. This technique is often used in chemical engineering to obtain very pure substances, or to recover sellable products from waste solutions. Fractional crystallization can be used for purification or analysis.

44. *Given that the solubility increases rapidly with increase in temperature for* KNO_3 *when compared to NaCl, the substance that crystallization out last on cooling a super saturated solution of a mixture of the two salts will be*

(a) KNO_3 *(b) NaCl (c) both (d) neither*

45. *Consider that the solubility of a substance increases and then decreases with increase in temperature after the transition temperature is reached. Such a substance cannot be crystallizated _____ its transition temperature by the normal method.*

(a) below (b) above (c) at (d) can not say

46. *Fractional crystallization makes use of the difference in _____*

(a) rate of dissolution (b) puroty

(c) solubilities (d) none of these

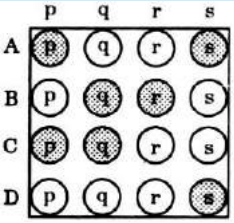
47. *Fractional crystallization can be compared to fractional distillation where a difference in _____ is used for separating mixtures.*

(a) solubilities (b) melting points

(c) boiling points (d) densities

SECTION - IV
Matrix - Match Type

This section contains Matrix-Match type questions. 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 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-p, a-s, b-q, b-r, c-p, c-q and d-s, then the correctly bubbled 4 x 4 matrix should be as follows:



48. ***Match the mixture in in Column I with the type of mixture in Column II***

Column I	***Column II***
(a) salt in water	*(p) solid in solid*
(b) soda water	*(q) gas in gas*
(c) air	*(r) solid in liquid*
(d) bronze	*(s) gas in liquid*

49. ***Match the examples of changes in Column I with their type in Column II***

Column I	***Column II***
(a) CO_2 *gas to* CO_2 *slod*	*(p) Chemical change*
(b) H_2 *molecules* $\rightarrow$ *Helium atoms*	*(q) Nuclear fission*
(c) $C \rightarrow CO_2$	*(r) Nuclear fusion*

(d) Uranium $\rightarrow$ Lead *(s) Physical change*

50. Match the separation method in Column I that can be used for separating mixtures given in Column II

Column I	***Column II***
(a) Sedimentation	*(p) Mixture of CO_2 and HCl gas*
(b) Fractional distillation	*(q) mixture of sand in water*
(c) Fractional crystallisation	*(r) mixture of kerosene and petrol*
(d) Diffusion	*(s) mixture of NaCl and KNO_3*

SECTION - I

Straight Objective Type

1. *Marble, limestone and chalk have the formula $CaCO_3$. They are all compounds. Diamond is pure carbon and hence an element.*
Hence C is the correct option.

2. *Brass is an alloy of copper and zinc and hence not a pure substance. Copper wire is made up of copper atoms; aluminium sheet of aluminium atoms and wrought iron is pure iron.*
Hence A is the correct option.

3. *As carbon, Sulphur and Phosphorous are elements; they do not break into simpler substances on simple heating. Zinc carbonate however is a compound. On simple heating Zinc carbonate decomposes into Zinc oxide and carbon dioxide.*
Hence D is the correct option.

4. *A homogeneous mixture has uniform composition throughout the mixture. Sugar solution, brine solution and mountain air have uniform composition. The composition of soil is not uniform.*
Hence C is the correct option.

5. *Marsh gas is methane made up of carbon and hydrogen atoms. Dry ice is solid carbon dioxide made up of carbon and oxygen atoms. Well water is a mixture of water and other dissolved salts and is made up of different kinds of atoms. Ozone has the formula O_3 and is made up of only oxygen atoms.*
Hence D is the correct option.

6. *A homogeneous mixture of two liquids can be separated by fractional distillation by slowly heating to increase the temperature of the mixture. The liquid with the lower boiling point boils off first as the temperature reaches its boiling point.*

Hence D is the correct option.

7. *Chromatography is a method used for separating a complex mixture.*
Hence B is the correct option.

8. *Solubility is the amount of a solid that dissolves in a given amount of solvent at a given temperature. Fractional crystallisation uses the difference in solubility's to separate two dissolved solids.*
Hence D is the correct option.

9. *An amalgam is a mixture of mercury with other elements.*
Hence B is the correct option.

10. *An alloy is an uniform mixture of two or more metals.*
Hence C is the correct option.

11. *Soda water is carbon dioxide gas dissolved under pressure in water.*
Hence B is the correct option.

12. *Cloud is made up of condensed water droplets in air.*
Hence C is the correct option.

13. *Dry air is a solution of oxygen (solute - as it is present to lesser extent) in nitrogen (solvent - as it is present to larger extent).*
Hence A is the correct option.

14. *By definition a solution is a homogeneous mixture formed due to the physical process of dissolution of solute in solvent. The constituent present to a larger extent is solvent while the constituent present to smaller extent is solute.*
Hence D is the correct option.

15. *All three options a, b, and c are incorrect. See question number 14.*
Hence D is the correct option.

16. *Increasing solvent quantity makes the solution unsaturated. Since some substances show decrease in solubility on increase in temperature option c is incorrect. Increasing solute quantity will simply result in the solute added to settle at the bottom without dissolving.*
Hence A is the correct option.

17. *In a chemical change one or more new substance is formed. In a nuclear reaction also one or more new substance is formed. In a chemical change the change is due to valence electrons whereas in a nuclear reaction the change is due to the nuclear particles.*
Hence D is the correct option.

18. *In a physical change there is no change in physical properties.*
Hence A is the correct option.

19. *Chromatography is based on the principle of differential movement of particles through another medium.*
Hence C is the correct option.

20. *A solute is present to a lesser extent - when compared to a solvent in a given solution. As oxygen is present to a lesser extent when compared to nitrogen in air, oxygen (solute) is dissolved in nitrogen (solvent).*
Hence B is the correct option.

21. *Compounds can be broken into simpler Substances in chemical reactions by beating or in nuclear reactions by fission, or by dissociation into ions on dissolution.*
Hence D is the correct option.

22. *A element by definition can not be broken into simpler substances by chemical methods, a compound can be broken into simpler Substances by chemical methods and a mixture consists of two or more substances mixed in a random way without reacting. As Cobalt cannot be broken into simpler substances by chemical methods it is an element. As ozone can be decomposed by heating into oxygen molecules and marble can be decomposed by heating into calcium oxide and carbon dioxide, so both ozone and marble are compounds. Ink is a mixture of dyes and other chemicals. Milk is a colloid of proteins and other nutrients in water.*

Hence A is the correct option.

23. *As sulphur dioxide has a relatively low boiling point of* $10^{o}C$, *cooling the gases to just below* $10^{o}C$ *will convert sulphur dioxide to liquid. This is the most economical method of separating the two gases.*

Hence C is the correct option.

24. *A mixture of the salt* $NaNO_3$ *in water can be separated by boiling. Water boils off leaving the salt behind.*

Hence A is the correct option.

25. *As iodine on heating sublimes slowly heating the mixture can separate iodine from other substances.*

Hence B is the correct option.

SECTION - II

Assertion - Reason Questions

26. *A mixture is not a pure substance as it contains two or more pure substances mixed in varying proportion. The simple individual constituents in a mixture are thus pure substances.*

Hence C is the correct option.

27. *A compound is formed by chemical combination of two (or more) elements or simple compounds. A compound can be broken into the simpler elements or compounds by chemical reactions and not physical methods.*
Hence A is the correct option.

28. *Mixing two or more substances randomly forms a mixture. No chemical reaction is involved. It is a physical process. A mixture can be separated by physical methods as the constituents have different physical properties like solubility, boiling point etc.*
Hence A is the correct option.

29. *A compound is formed by chemical combination of two (or more) elements or simple compounds. The compound will have properties that are different when compared to the constituents that form it.*
Hence D is the correct option.

30. *A saturated solution is a solution in which the maximum of solute in a given quantity of solvent is dissolved. A concentrated solution merely signifies that the amount of solvent (usually water) in a solution is less when compared to the solute. It is also true that some salts have low solubilities though this is not the reason for Statement 1.*
Hence B is the correct option.

31. *The solubility of all gases decreases as temperature is increased as the kinetic energy of the particles increases (Statement 2).*
Hence A is the correct option.

32. *Weight fraction and weight% are calculated using the weight of the substances in the mixture. Since the quantity of matter does not change even if the matter is heated or cooled, both, weight fraction and weight% are independent of temperature Statement 2.*
Hence A is the correct option.

33. *Solubility of a substance depends on the nature of both solute and solvent and the temperature (also pressure if gaseous). Polar substances dissolve in polar solvents. Statement 2 is correct but not the only reason for Statement 1.*
Hence B is the correct option.

34. *The rate of dissolution depends on agitation, temperature and size of particles. Statement 2 is true but not the only reason for Statement 1.*
Hence B is the correct option.

35. *Carbon dioxide is a compound formed by chemical combination of carbon and oxygen in the ratio 3 : 8 by weight. Statement 2 is also true but not the reason for Statement 1.*
Hence D is the correct option.

36. *Rain water is a heterogeneous mixture as its composition is not uniform. Hence Statement 2 is reason for Statement 1.*
Hence A is the correct option.

37. *As copper sulphate is a true solution in which -the particle size is smaller than* $10\,\text{Å}$ *the solution will not show Tyndall Effect.*
Hence A is the correct option.

38. *Tyndall Effect and Brownian Movement is shown by both suspensions and colloids where the particle size is greater than* $10\,\text{Å}$*. Statement 2 is true but not the reason for Statement 1.*
Hence B is the correct option.

39. *A super saturated solution is unstable as there is more solute than what the solubility of the solute will allow at the particular temperature. The solution is in an unstable state. A slight*

disturbance will cause the excess solute to come out of a super saturated solution, as a precipitate.
Hence A is the correct option.

40. *Solubility is a measure of the actual quantity of solute in a given amount of solvent at a given temperature. Concentration just indicates that the amount of solvent is more than another solution that is not concentrated but dilute. Statement 1 is strictly speaking not correct.*
Hence D is the correct option.

SECTION - III
Linked Comprehension Type

41. *In a solution the solute particle size is of the order of 1 to* $10\,\text{Å}$. *In colloids the size is 10 to 1000A and in suspensions the size is greater than* $1000\,\text{Å}$.
Hence D is the correct option.

42. *Filtration can be used for separation if the particle size is greater than the fine holes present in the filter paper.*
Hence A is the correct option.

43. *Boiling can separate a true solution of a substance in water.*
Hence B is the correct option.

44. *A look at the solubility curve indicates that the intersection of the two curves of* KNO_3 *and* $NaCl$ *is quite close to the y-axis. Thus most of the* $NaCl$ *would have come out of solution before* KNO_3 *will crystallize out.*
Hence A is the correct option.

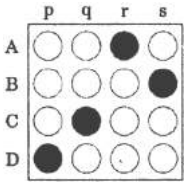
45. *Above the transition temperature solubility decreases with temperature and hence a supersaturated solution cannot be prepared for crystallisation by normal method.*
Hence B is the correct option.

46. *Fractional crystallisation makes use of solubility differences between substances to separate them from a mixture.*
Hence C is the correct option.

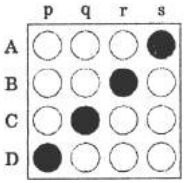
47. *In fractional distillation difference in boiling points help in separating two liquids.*
Hence C is the correct option.

SECTION - IV
Matrix - Match Type

48.



49.



50.