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CHAPTER 1

Matter in Our Surroundings

1. OBJECTIVE QUESTIONS

1. In which form, do the water molecules have less kinetic energy?
(a) Ice
(b) Water
(c) Steam
(d) All of them have equal kinetic energy

Ans : (a) Ice
Ice has less kinetic energy as compared to water and steam.

2. Which of the following describes the liquid phase?
(a) It has a definite shape and a definite volume.
(b) It has a definite shape but not definite volume.
(c) It has a definite volume but not a definite shape.
(d) It has neither a definite shape nor a definite volume.

Ans : (c) It has a definite volume but not a definite shape.
Liquids have definite volume but not a definite shape. They take the shape of the container in which they are kept.

3. Which of these choices is defined "Standard Pressure"?
(a) 14.7 psi (b) 1 atm
(c) 760 torr (d) All of these

Ans : (d) All of these
All the units are used as standard units for pressure.
1 atm = 760 torr = 14.7 pounds per square inch (psi.)

4. The process of evaporation causes:
(a) heating (b) cooling
(c) increase in temperature (d) none of these

Ans : (b) cooling
Evaporation causes cooling due to escape of high energy particles.

5. Ice floats on the surface of water because:
(a) it is heavier than water
(b) the density of both water and ice is the same
(c) ice is lighter than water
(d) none of these

Ans : (c) ice is lighter than water
Due to presence of open spaces in the cage like structure of ice its density is less than water, hence ice is lighter than water.

6. Which of the following statements is not correct?
(a) Matter is continuous in nature.
(b) Inter-particle spaces are maximum in the gaseous state of a substance.
(c) Particles which constitute the matter follow a zigzag path.
(d) Solid state is the most compact state of a substance.

Ans : (c) Particles which constitute the matter follow a zigzag path.
Only in gaseous state the particles follow a zigzag path.

7. Which of the following has highest kinetic energy?
(a) Particles of ice at 0°C
(b) Particles of water at 0°C
(c) Particles of water at 100°C
(d) Particles of steam at 100°C

Ans : (d) Particles of steam at 100°C

8. Kinetic energy of molecules is directly proportional to
(a) temperature (b) pressure
(c) both (a) and (b) (d) atmospheric pressure

Ans : (a) temperature
With increase in temperature, the kinetic energy of the particles also increases.

9. The inter-particle force are the strongest in
(a) hydrogen (b) methyl alcohol
(c) water (d) sodium chloride

Ans : (d) sodium chloride
Sodium chloride is a crystalline solid and inter-particle force are the strongest in it.

10. The substance having the maximum tendency to flow is
(a) water (b) sodium

(c) sodium chloride (d) chlorine

Ans : (d) chlorine
Chlorine being a gas, has maximum fluidity.

11. The electric bulb on long use forms a black coating on its inner surface.
The process associated with this is
(a) melting of tungsten
(b) sublimation of tungsten
(c) oxidation of tungsten
(d) reduction of tungsten

Ans : (b) sublimation of tungsten

12. If a few spoons of salt are dissolved in pure water then
(a) its b.pt. becomes less than 100°C
(b) its b.pt. becomes more than 100°C
(c) its freezing point becomes more than 0°C
(d) none of these

Ans : (b) its b.pt. becomes more than 100°C
Impurities increase the boiling point of a liquid.

13. A gas can be best liquefied
(a) by increasing the temperature
(b) by lowering the pressure
(c) by increasing the pressure and reducing the temperature
(d) none of these

Ans : (c) by increasing the pressure and reducing the temperature
A gas can be liquefied by increasing the pressure and reducing the temperature.

14. Which of the following is not correct regarding gases?
(a) Gases exert pressure.
(b) Gases have large intermolecular spaces.
(c) Gases have weak tendency to diffuse.
(d) Gases have weak intermolecular forces of attraction.

Ans : (c) Gases have weak tendency to diffuse.
Gases can diffuse to a large extent.

15. The evaporation of a liquid can be best carried out in a
(a) beaker (b) China dish
(c) test tube (d) flask

Ans : (b) China dish
China dish has the maximum surface area available for evaporation.

16. The state of matter which consists of super energetic particles in the form of ionized gases is called
(a) gaseous state
(b) liquid state
(c) Bose-Einstein condensate
(d) plasma state

Ans : (d) plasma state
Plasma state consists of super energetic and super excited particles.

17. Which of the following pair of gases cannot be separated by diffusion method?
(a) SO_2 and H_2 (b) CO_2 and N_2O
(c) NH_3 and N_2 (d) CO_2 and H_2

Ans : (b) CO_2 and N_2O
Both CO_2 and N_2O have same molecular weights and densities. Therefore, they cannot be separated by diffusion.

18. Sugar syrup, usually used to coat sweets with sugar, becomes hard when cooled. From this we can conclude that sugar syrup is:
(a) a saturated solution
(b) an unsaturated solution
(c) not a solution
(d) none of these

Ans : (a) a saturated solution
From sugar syrup, solid sugar separates out as solid cooling and syrup becomes hard indicating that syrup is saturated solution.

19. To separate the solids which are insoluble in liquids such that solid is heavier than liquid:
(a) sedimentation and decantation
(b) evaporation and condensation
(c) filtration
(d) condensation and crystallization

Ans : (a) sedimentation and decantation
Solids which are insoluble in liquids but heavier that liquids can be allowed to sediment and the liquid can be decanted.

20. Which changes of state occur during distillation?
(a) Boiling followed by filtration
(b) Boiling followed by condensation
(c) Condensation followed by boiling
(d) Filtration followed by boiling

Ans : (b) Boiling followed by condensation
In distillation, boiling followed by condensation of vapours takes place.

21. The value of latent heat of vaporisation of water kcal/kg is
(a) 80 (b) 540
(d) 334 (b) 225

Ans : (b) 540
540 Kcal/kg

22. A saturated salt water solution was heated and allowed to cool without adding any more salt. What will happen?
(a) Some salt appears to settle at the bottom.
(b) Some more salt can be dissolved now.
(c) No change takes place.
(d) Both (a) and (b)

Ans : (c) No change takes place.
Normally, a saturated solution on heating, some more solute gets dissolved but on cooling again that extra

solute dissolved crystallizes out. But as no more salt is added no change takes place.

23. When liquid starts boiling, further heat energy which is supplied
(a) is lost to the surroundings as much
(b) increases the temperature of the liquid
(c) increases the kinetic energy of the particles in the liquid
(d) is absorbed as latent heat of vaporisation by the liquid.

Ans : (d) is absorbed as latent heat of vaporisation by the liquid.
Heat energy is absorbed as latent heat of vaporisation, hence there is no change in temperature till the complete liquid is converted to vapours.

24. The forces of attraction between the particles of matter is maximum in
(a) iron rod (b) kerosene oil
(c) glycerine (d) dry air

Ans : (a) iron rod
In iron rod (solid) there is maximum force of attraction between the particles.

25. You can separate a mixture of sand, salt and water by:
(a) filtration and distillation
(b) decantation and evaporation
(c) filtration and decantation
(d) decantation and crystallization

Ans : (b) decantation and evaporation
By decantation, sand can be separated from salt solution in water. Salt solution on evaporation leaves a residue of salt.

26. The substance with least inter-particle space is
(a) methanol (b acetic acid
(c) copper (d) oxygen

Ans : (c) copper
Solid particles have least inter-particle space between them.

27. Large volume of Compressed Natural Gas (CNG) is available in small cylinders to us due to its property of
(a) high inflammability (b) easy availability
(c) high compressibility (d) low density

Ans : (c) high compressibility
Due to its high compressibility, large volumes of a gas can be compressed into a small cylinder and transported easily.

28. Which of the following statements about evaporation is incorrect?
1. It is bulk phenomena.
2. It is a fast process.
3. It takes place at all temperatures.
(a) 2 and 3 (b) 1 and 2
(c) 1 and 3 (d) 1, 2 and 3

Ans : (b) 1 and 2
Evaporation is a surface phenomena and it is a slow process.

29. Alcohol exists as a liquid at room temperature because
(a) the intermolecular forces are strong enough to keep its particles bound to each other
(b) its melting point is below room temperature
(c) it is highly compressible
(d) both (a) and (b)

Ans : (d) both (a) and (b)
In alcohol, the intermolecular forces of attraction between the particles bind them to one another such that if flows.

30. Which of the following statement is NOT true?
(a) A mixture of water and milk can be separated by filtration.
(b) A mixture of powdered salt and sugar can be separated by fractional crystallisation.
(c) Loading is a process which involves alum.
(d) Salt from sea water is obtained by evaporation.

Ans : (a) A mixture of water and milk can be separated by filtration.
A mixture of water and milk cannot be separated by filtration as both get filtered.
A mixture of powdered salt and sugar can be separated by fractional crystallisation.
Loading is a process which involves alum.
Salt from sea water is obtained by evaporation.

31. Which of the following is an example of a solid-in-gas mixture?
(a) Soil (b) Smoke
(c) Moisture (d) Dew

Ans : (b) Smoke
Minute solid particles float along with vapours (fumes) in the smoke. Hence, smoke is a solid-in-gas mixture.

32. Two miscible liquids having different boiling points can be separated by:
(a) sublimation (b) evaporation
(c) fractional distillation (d) loading

Ans : (c) fractional distillation
Two miscible liquids having different boiling points can be separated by fractional distillation.

33. In an experiment oxygen was added to hydrogen

and heated. On burning a substance containing both oxygen and hydrogen water was formed. What is this substance?

(a) Element (b) Compound
(c) Solution (d) Mixture

Ans : (b) Compound
It is a compound and it is water that contains both hydrogen and oxygen. Water is a compound as the properties of hydrogen and oxygen are not retained by it.

34. Evaporation is directly proportional to
1. humidity
2. surface area
3. temperature
4. wind speed

(a) 1 and 4 (b) 2 and 3
(c) 3 and 4 (d) 2, 3 and 4

Ans : (d) 2, 3 and 4
Rate of evaporation will increase with an increase in surface area, temperature and wind speed.

35. Which of the following indicates the relative randomness of particles in the three states of matter?

(a) Solid > Liquid > Gas
(b) Liquid < Solid < Gas
(c) Liquid > Gas > Solid
(d) Gas > Liquid > Solid

Ans : (d) Gas > Liquid > Solid
Gas is the most disordered state and solid is the most ordered state.

36. Rate of evaporation of an aqueous solution decreases with increase in

(a) wind speed (b) temperature
(c) humidity (d) surface area

Ans : (c) humidity
Air around us cannot hold more than a definite amount of water vapour at a given temperature which is known as humidity. So, if the air is already rich in water vapour, it will not take up more water; therefore, rate of evaporation of water will decrease.

37. The state of matter which consists of super energetic particles in the form of ionized gases is called

(a) gaseous sate
(b) liquid state
(c) Bose-Einstein condensate
(d) plasma state

Ans : (d) plasma state
Plasma state consists of super energetic and super excited particles. These particles are in the form of ionized gases and free electrons.

38. The quantity of matter present in an object is called its

(a) weight (b) gram
(c) mass (d) density

Ans : (c) mass

39. Which of the following statements does not go with the liquid state?

(a) Particles are loosely packed in the liquid state.
(b) Fluidity is maximum in the liquid state.
(c) Liquids cannot be compressed much.
(d) Liquids take up the shape of any container in which they are placed.

Ans : (b) Fluidity is maximum in the liquid state.
Fluidity is maximum in gaseous state.

40. Filtration as a method of separation can be used for mixtures that are:

(a) homogeneous and liquid-in-gas mixtures
(b) heterogeneous and liquid-in-liquid mixtures
(c) homogeneous and solid-in-liquid mixtures
(d) heterogeneous and solid-in-liquid mixtures

Ans : (d) heterogeneous and solid-in-liquid mixtures
Mixtures that are heterogeneous and solid in liquid mixtures can be separated by filtration.

41. Which of the following mixtures will be the most difficult to separate?

(a) Iron filings (powder) + sand
(b) Sand + water
(c) Sawdust + stones
(d) Nitrogen + hydrogen

Ans : (d) Nitrogen + hydrogen
Nitrogen and hydrogen mixture (a gaseous mixture) is difficult to separate since it has to be cooled to very low temperatures to convert into liquids below their boiling points and then distilling them.

42. 450 K temperature may be written in Celsius scale as

(a) 278°C (b) 450°C
(c) 0°C (d) 177°C

Ans : (d) 177°C

$$K = 273 + {}^\circ\text{C}$$
$$450 = 273 + {}^\circ\text{C}$$
$${}^\circ\text{C} = 450 - 273 = 177^\circ\text{C}$$

43. Which of the following states has the least energetic molecules?

(a) Solids (b) Liquids
(c) Gases (d) Plasmas

Ans : (a) Solids
Due to lowest kinetic energy, the molecules of solid do not move from their positions.

44. Which of the following process(es) release(s) heat?
1. Condensation
2. Vaporisation
3. Freezing
4. Melting

(a) Only 1 (b) Only 4
(c) 1 and 3 (d) 2 and 4

Ans : (c) 1 and 3

45. A liquid is kept in a China dish. The evaporation of

the liquid can be accelerated
(a) by keeping the dish in the open
(b) by blowing air into the liquid
(c) by keeping the dish under a running fan
(d) all of these

Ans : (d) all of these
The rate of evaporation increases by increasing the surface area, blowing of wind and increasing the temperature.

46. Some crushed ice is put in a test tube and warmed. The ice melts because its particles
(a) change their size
(b) gain heat energy and escape
(c) gain heat energy and become closer
(d) gain heat energy and move away from their fixed positions

Ans : (d) gain heat energy and move away from their fixed positions

47. Which word describes the following change?
$I_{2(s)} \longrightarrow I_{2(g)}$

(a) Boiling (b) Condensation
(c) Evaporation (d) Sublimation

Ans : (d) Sublimation
A change of state directly from solid to gas without changing into liquid state is called sublimation.

48. Which of the following decreases the rate of evaporation?
(a) Surface area (b) Humidity
(c) Temperature (d) Wind

Ans : (b) Humidity
Humidity decreases the rate of evaporation.

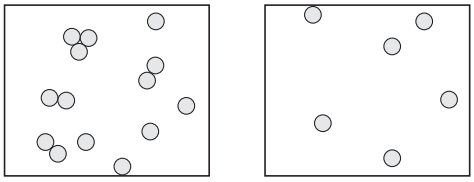
49. Evaporation of a material takes place
(a) above its boiling point
(b) above its melting point
(c) below its boiling point
(d) below its melting point

Ans : (c) below its boiling point
The phenomenon of change of a liquid into vapour at any temperature below its boiling point is called evaporation.

50. Which one of the following statements is wrong for gases?
(a) Gases do not have a definite shape and volume.
(b) Volume of the gas is equal to the volume of the container confining the gas.
(c) Confined gas exerts uniform pressure on the walls of container in all directions.
(d) Mass of the gas cannot be determined by weighing a container in which it is enclosed.

Ans : (d) Mass of the gas cannot be determined by weighing a container in which it is enclosed.
The mass of gas can be determined by weighing the empty container first, then filling it with as and again weighing the container filled with gas. The difference of two readings gives the mass of gas.

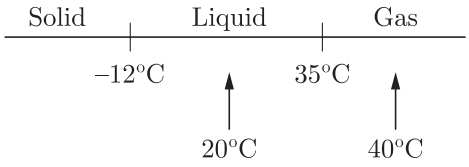
51. The diagrams show the arrangement of particles of a substance at temperatures 20°C and 40°C.



What are the likely melting and boiling points of the substance?

	Melting point/°C	**Boiling point/°C**
(a)	−12	35
(b)	−25	45
(c)	−98	100
(d)	44	80

Ans : (a)
At 20°C, substance is a liquid. At 40°C, substance is a gas. Thus, its melting point is below 20°C and its boiling point is below 40°C.



52. Addition of impurities to water:
(a) decreases the freezing point of water
(b) increases the boiling point of water
(c) does not affect the freezing or boiling point of water
(d) both (a) and (b)

Ans : (d) both (a) and (b)
The freezing point of water decreases with addition of impurities like urea, glucose, salt, calcium chloride, etc. The extent of lowering of freezing point depends upon the amount of substance added to the water. Similarly, the boiling point of water increases with addition impurities.

53. Evaporation of a liquid can take place
(a) at its boiling point
(b) below its boiling point
(c) above its boiling point
(d) at fixed temperature

Ans : (b) Evaporation is conversion of a liquid into vapours below its boiling point.

54. Which of the following represent the densest state of matter?
(a) Solids (b) Liquids

(c) Gases (d) Vapours

Ans : (a) Solids
Solids have maximum density due to closest packing of particles.

55. When ice melts to water, then heat is
(a) absorbed
(b) evolved
(c) no change
(d) depends on conditions

Ans : (a) absorbed
Heat is absorbed when ice is converted into water.

2. FILL IN THE BLANK

1. A mixture of sulphur and charcoal can be separated by ..... method.
Ans : solvent extraction

2. During distillation of iodine and methyl alcohol the non-volatile substance is .....
Ans : iodine

3. Magnesium sulphate in water is a ..... mixture.
Ans : homogeneous

4. Compounds are formed by chemically combining elements in a ..... proportion by weight.
Ans : definite

5. A mixture of iodine and sand are separated by method of .....
Ans : sublimation

6. The number of atoms present in the molecules of an element is called its .....
Ans : atomicity

7. During separation of CO_2 and hydrogen gas by diffusion the gas that diffuses rapidly is .....
Ans : hydrogen

8. During the separation of CO_2 and O_2 by the process of preferential liquefaction, the component ..... liquefies.
Ans : CO_2

9. ..... can be classified chemically into pure substance and mixtures.
Ans : Matter

10. Soda water can be separated by ..... the pressure.
Ans : lowering

11. Both elements and compounds are ..... substances.
Ans : pure

12. The principle of difference in boiling points of liquid is used in the .....
Ans : fractional distillation

13. A special technique used for separation and identification of the constituents in the mixture is .....
Ans : chromatography

14. A mixture of oil and water can be separated by using .....
Ans : separating funnel

15. A mixture of barium sulphate and H_2O can be separated by the method of .....
Ans : filtration

3. TRUE/FALSE

1. A homogeneous mixture of two liquids can be separated using fractional distillation method.
Ans : True

2. Sand and sawdust can be separated by gravity method.
Ans : True

3. The melting and boiling points of a mixture is fixed depending on the proportions of its components it is made of.
Ans : True

4. Separation of CCl_4 from CS_2 can be carried out by separating funnel method.
Ans : False

5. A mixture of glucose water can be separated by the method of evaporation.
Ans : True

6. A handful of soil is homogeneous mixture of solids.
Ans : False

7. The components of a mixture can never be separated by physical methods.
Ans : False

8. Distilled water cannot be separated into its constituents by physical methods.
Ans : True

9. The properties of compounds are same from those of the elements of which they are made.
Ans : False

10. Baking soda is a compound.
Ans : True

4. MATCHING QUESTIONS

DIRECTION : In the section, each question has two matching lists. Choices for the correct combination of elements from List-I and List-II are given as options (a), (b), (c) and (d) out of which one is correct.

1.

List-I		List-II	
(P)	Liquid → solid	(1)	Evaporation
(Q)	Solid → gas	(2)	Condensation
(R)	Gas → liquid	(3)	Sublimation
(S)	Liquid → gas	(4)	Solidification

	P	Q	R	S
(a)	3	2	1	4
(b)	4	3	2	1
(c)	2	3	1	4
(d)	1	2	3	4

Ans : (b) P – 4, Q – 3, R – 2, S – 1

2.

List-I		List-II	
(P)	Increase in surface area	(1)	Evaporation increases
(Q)	Decrease in temperature	(2)	Evaporation decreases
(R)	Evaporation	(3)	Bulk phenomenon
(S)	Boiling	(4)	Surface phenomenon

	P	Q	R	S
(a)	1	2	4	3
(b)	1	4	3	2
(c)	2	1	3	4
(d)	4	2	3	1

Ans : (a) P – 1, Q – 2, R – 4, S – 3

3.

List-I		List-II	
(P)	In liquids, particles are held together	(1)	Slightly
(Q)	Liquids can be compressed	(2)	Less firmly
(R)	In gases, particles are held together	(3)	Most firmly
(S)	In solids, particles are held together	(4)	Least firmly

	P	Q	R	S
(a)	1	4	3	2
(b)	2	1	3	4
(c)	2	1	4	3
(d)	3	2	1	4

Ans : (c) P – 2, Q – 1, R – 4, S – 3

4.

List-I		List-II	
(P)	Liquid	(1)	Definite shape
(Q)	Solid	(2)	Definite volume
(R)	Plasma	(3)	Super low density
(S)	BEC	(4)	Super energetic

	P	Q	R	S
(a)	2	1	4	3
(b)	1	3	2	4
(c)	3	2	1	4
(d)	1	2	4	3

Ans : (a) P – 2, Q – 1, R – 4, S – 3

5.

List-I		List-II	
(P)	Particles move randomly	(1)	Water
(Q)	Layers can slide over each other	(2)	Sugar
(R)	Changes directly to gaseous state	(3)	Nitrogen
(S)	Particles are not free to move	(4)	Ammonium chloride

	P	Q	R	S
(a)	3	1	2	4
(b)	3	1	4	2
(c)	1	3	2	4

	P	Q	R	S
(d)	2	3	4	1

Ans : (b) P – 3, Q – 1, R – 4, S – 2

6.

Column I		Column II	
(P)	Sublimation	(1)	Separation of sand and sawdust
(Q)	Magnetic separation	(2)	Separation of NaCl from KNO_3
(R)	Gravity method	(3)	Separation of sand and wax
(S)	Solvent extraction	(4)	Separation of iron and sand
(T)	Fractional crystallisation	(5)	Separation of iodine and sand

Ans : P – 5, Q – 4, R – 1, S – 3, T – 2

5. ASSERTION AND REASON

DIRECTION : In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

1. **Assertion :** The term vapour is used to represent the gaseous state of a substance which is otherwise liquid at room temperature.
Reason : It is proper to regard the gaseous state of ammonia as vapours.

Ans : (c) Assertion (A) is true but reason (R) is false. It is not proper to regard ammonia in gaseous state as vapour because ammonia is not liquid at room temperature.

2. **Assertion :** Camphor disappears without leaving any residue.
Reason : Camphor undergoes sublimation.

Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

3. **Assertion :** Naphthalene does not leave any residue when kept open for some time.
Reason : The conversion of a solid directly into gas is called condensation.

Ans : (c) Assertion (A) is true but reason (R) is false. The conversion of a solid directly into gas is called sublimation.

4. **Assertion :** It is easier to cook food at high altitudes.
Reason : The boiling point of water increases at high altitudes.

Ans : (d) Assertion (A) is false but reason (R) is true. It is difficult to cook food at high altitudes since the boiling point of water decreases at high altitudes and it does not provide sufficiently high temperature to the food to get cooked.

5. **Assertion :** During evaporation of liquids, the temperature remains unaffected.
Reason : Kinetic energy of the molecules is inversely proportional to absolute temperature.

Ans : (d) Assertion (A) is false but reason (R) is true. During evaporation of liquids, the temperature decreases due to escape of molecules with high energy. Kinetic energy of the molecules is directly proportional to absolute temperature.

6. **Assertion :** Naphthalene, camphor, iodine, ammonium chloride are some common examples of the substances which undergo sublimation.
Reason : All solids are first converted to liquids and then to gases on heating.

Ans : (c) Assertion (A) is true but reason (R) is false. Certain solids directly change to the gaseous state upon heating without passing through the liquid state. This process is called sublimation.

7. **Assertion :** Ice floats on the surface of water.
Reason : The density of both water and ice is same.

Ans : (c) Assertion (A) is true but reason (R) is false. Ice floats of the surface of water because the density of water is more than ice. Ice is lighter than water due to open spaces in its crystalline structure.

8. **Assertion :** There is no change in the temperature of a substance when it undergoes a change of state through it is still being heated.
Reason : The heat supplied is absorbed either as latent heat of fusion or as latent heat of vaporisation.

Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
The heat supplied during the state transformation does not increase the kinetic energy but is absorbed for conversation of complete solid to liquid or complete liquid to vapours.

9. **Assertion :** There is no change in the temperature of a substance when it undergoes a change of state though it is still being heated.
Reason : The heat supplied is absorbed either as latent heat of fusion or as latent heat of vaporisation.

Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
The heat supplied during the state transformation does not increase the kinetic energy but is absorbed for conversion of complete solid to liquid or complete liquid to vapours.

10. **Assertion :** Solids do not diffuse in air.
Reason : The particles are closely packed in solids.

Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
As the particles of solids are closely packed, there exist strong forces of attraction between the particles. Hence, solids do not diffuse in air.

11. **Assertion :** The conversion of a gas directly into solid is called condensation.
Reason : Naphthalene leaves residue when kept open for some time.

Ans : (d) Assertion (A) is false but reason (R) is true. The conversion of a gas directly into solid is called desublimation. Naphthalene does not leave any residue when kept open for some time.

12. **Assertion :** Liquids diffuse less easily as compared to gases.
Reason : Intermolecular forces are greater in gases.

Ans : (c) Assertion (A) is true but reason (R) is false. Liquids diffuse slowly as compared to gases. Liquids have stronger intermolecular forces as compared to gases hence liquid molecules are less free to move than gases.

13. **Assertion :** At normal pressure (1 atm) the boiling point of water is 100°C or 373.15 K.
Reason : As the pressure increases, boiling point of water also increases.

Ans : (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

14. **Assertion :** The rate of evaporation increases with increase in temperature.
Reason : Increase in temperature increases the kinetic energy of the particles.

Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
Increase in temperature increases the kinetic energy of the particles, as a result of which more and more particles escape from liquid to vapour state.

15. **Assertion :** Naphthalene, camphor, iodine, ammonium chloride are some common examples of the substances which undergo sublimation.
Reason : All solids are first converted to liquids and then gases on heating.

Ans : (c) Assertion (A) is true but reason (R) is false. Certain solids directly change to the gaseous state upon heating without passing through the liquid state. The process is called sublimation.

16. **Assertion :** The intermolecular forces in solid state are stronger than those in the liquid state.
Reason : The space between the particles of matter is called intermolecular space.

Ans : (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

17. **Assertion :** Liquids diffuse easily as compared to gases.
Reason : Intermolecular forces are greater in gas.

Ans : (d) Assertion (A) is false but reason (R) is true. Liquids diffuse slowly as compared to gases, Liquid molecules are less free to move because intermolecular forces in liquids are greater than in gases.

18. **Assertion :** Ice floats on the surface of water.
Reason : The density of both water and ice is same.

Ans : (c) Assertion (A) is true but reason (R) is false. Ice floats on the surface of water because the density of water is more than ice. Ice is lighter than water due to open spaces in its crystalline structure.

19. **Assertion :** Diffusion rate of oxygen is smaller than nitrogen.
Reason : Molecular size of nitrogen is smaller than oxygen.

Ans : (c) Assertion (A) is true but reason (R) is false. Diffusion rate of oxygen is smaller than nitrogen as molecular mass of oxygen is greater than nitrogen, as diffusion rate $\propto \frac{1}{\sqrt{M}}$.
Molecular size of oxygen is smaller than nitrogen,

20. **Assertion :** A gas can be easily compressed by applying pressure.
Reason : Since the inter-particle spaces in the gaseous state are very small, they cannot be decreased by applying pressure.

Ans : (c) Assertion (A) is true but reason (R) is false. Since the inter-particle spaces in the gaseous state are very large, they can be decreased by applying pressure. Thus, a gas can be easily compressed by applying pressure.