

Matter in Our Surroundings

EXERCISE

Multiple Choice Questions

- The density of water is maximum at
(a) 0°C (b) 277K
(c) 100°C (d) 283K
- 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)
- As the solid melts to form liquid,
(a) Interparticle forces of attraction decreases
(b) the kinetic energy of the particles increases
(c) compressibility increases
(d) all of these
- Which of the following is not a characteristic of solids?
(a) high rigidity (b) high fluidity
(c) low compressibility (d) high density
- 300 K temperature may be written in Celsius scale as
(a) 300°C (b) 127°C
(c) 27°C (d) 573°C
- The physical state of water at 10°C is
(a) solid
(b) liquid
(c) gas
(d) may be solid or liquid
- The boiling point of water at normal atmospheric pressure is
(a) 273K (b) 373 K
(c) 100K (d) 0°C
- Which of the following has highest intermolecular forces of attraction?
(a) Liquid water
(b) Liquid ethyl alcohol
(c) Gaseous CO_2
(d) Solid CO_2
- Which of the following compounds will undergo sublimation?
(a) Common salt (b) Camphor
(c) Sugar (d) Sand
- Which one of the following gases undergoes diffusion most readily?
(a) LPG (b) Carbon dioxide
(c) Hydrogen (d) Nitrogen
- The standard temperature is taken as
(a) 0°C (c) 298 K
(c) 273 K (d) 20°C
- In which of the following substances, the Interparticle forces of attraction are the strongest?
(a) Sodium chloride (b) glycerine
(c) Ethyl alcohol (d) Carbon Dioxide
- Which of the following indicates the relative randomness of particles in the three states matter?
(a) Solid > liquid > gas (b) Liquid < solid < gas
(c) Liquid > gas > solid (d) Gas > liquid > solid
- The process of evaporation causes
(a) heating
(b) cooling
(c) increase in temperature
(d) none of these
- The conversion of a gas into liquid is called
(a) gasification (b) sublimation
(c) condensation (d) freezing
- The force that binds the particles of matter together is known as
(a) intermolecular (b) bond
(c) intermolecular force (d) nuclear
- 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
- Which of the following statements is not correct?
(a) Matter is continuous in nature.
(b) Interparticle spaces are maximum in the gaseous state of a substance.
(c) Particles which constitute the matter follow zig-zag path.
(d) Solid state is the most compact state of substance.
- 10°C temperature is equal to
(a) 163 K (b) 10 K
(c) 183 K (d) 283 K
- During evaporation, particles of a liquid change into vapors only
(a) from the surface
(b) from the bulk
(c) from both surface and bulk
(d) neither from surface nor from bulk
- Solids cannot be compressed because
(a) constituent particles are very closely packed

- (b) interparticle attractive forces are weak
(c) movement of constituent particle is resisted
(d) constituent particles diffuse very slowly
- 22.** The two major gases present in air are
(a) nitrogen and oxygen
(b) nitrogen and hydrogen
(c) hydrogen and oxygen
(d) nitrogen and carbon dioxide
- 23.** Evaporation of a liquid can take place
(a) at its boiling point
(b) below its boiling point
(c) at all temperatures
(d) at a fixed temperature
- 24.** A liquid is kept in an open 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 are correct
- 25.** The melting point temperature of the solid state and freezing point temperature of the liquid state of the same substance are
(a) both same (b) both different
(c) can't say (d) none of these
- 26.** 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.
- 27.** At constant temperature, in a given mass of an ideal gas
(a) the ratio of pressure and volume always remains constant
(b) volume always remains constant
(c) pressure always remains constant
(d) the product of pressure and volume always remains constant
- 28.** Rate of diffusion of a gas is
(a) directly proportional to its density
(b) directly proportional to its molecular mass
(c) directly proportional to the square root of its molecular mass
(d) inversely proportional to the square root of its molecular mass
- 29.** The quantity of matter present in an object is called its
(a) weight (b) gram
(c) mass (d) density
- 30.** At higher altitudes
(a) boiling point of a liquid increases
(b) boiling point of a liquid decreases
(c) no change in boiling point
(d) melting point of solid increases
- 31.** In which phenomenon water changes into water vapour below its boiling point?
(a) Evaporation (b) Condensation
(c) Boiling
(d) No such phenomenon exists
- 32.** The liquid which has the highest rate of evaporation is
(a) mercury
(b) nail polish remover (c) water
(d) alcohol-water mixture.
- 33.** When we put some crystals of potassium permanganate in a beaker containing water, we observe that after some time whole water has turned pink. This is due to
(a) boiling
(b) melting of potassium permanganate crystals
(c) sublimation of crystals
(d) diffusion
- 34.** 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.
- 35.** Which of the following properties is different for solids, liquids and gases?
(a) Movement of molecules
(b) Particle size of the substance
(c) Mass of the substance
(d) Energy exchanges
- 36.** Which of these choices is defined as "Standard Pressure"?
(a) 14.7 psi (b) 1 atm
(c) 760 torr (d) all of the above
- 37.** All liquids have same
(a) density (b) viscosity
(c) solubility (d) none of these
- 38.** Which has the least energetic molecules?
(a) Solids (b) Liquids
(c) Gases (d) Plasmas

39. Which of these choices will not change the state of matter?
 (a) Temperature (b) Crushing a crystal
 (c) Pressure (d) Electricity
40. Of the following, what is the densest state of matter?
 (a) Solids (b) Liquids
 (c) Gases (d) Vapors
41. When ice melts to water, then heat is
 (a) absorbed (b) evolved
 (c) no change
 (d) depends on conditions
42. If we add common salt in water then its freezing point
 (a) increases (b) decreases
 (c) remains constant
 (d) can't be determined
43. Which of the following has more heat content
 (a) 10 g of ice at 0°C
 (b) 10 g of water at 0°C
 (c) both have same heat content
 (d) their heat content cannot be compared
44. The value of latent heat of vaporization of water in cal/kg is
 (a) 80 (b) 540
 (c) 334 (d) 225
45. Minimum spaces between particles is the characteristic property of
 (a) liquids (b) solids
 (c) gases (d) none of these
46. 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 is correct
47. 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.
48. The large volumes of gases can be put into small volumes of cylinders because of their property known as
 (a) sublimation (b) compressibility
 (c) evaporation (d) solidification
49. In summer, we prefer wearing
 (a) dark nylon clothes
 (b) white cotton clothes
 (c) white silk clothes
 (d) dark silk clothes
50. Which of the following factors, when increased, affect the rate of evaporation adversely?
 (a) Temperature of liquid
 (b) Surface area of liquid exposed to surrounding
 (c) Humidity in air
 (d) Latent heat of condensation
51. When a teaspoon of solid sugar is dissolved in a glass of liquid water, what phase or phases are present after mixing?
 (a) Liquid only (b) Still solid and liquid
 (c) Solid only (d) None of these
52. 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
53. A gas can be compressed to a fraction of its volume. The same volume of a gas can be spread all over a room. The reason for this is that
 (a) the volume occupied by molecules of a gas is negligible as compared to the total volume of the gas
 (b) gases consist of molecules which are in a state of random motion
 (c) gases consist of molecules having very large intermolecular space which can be reduced or increased under ordinary conditions
 (d) one mole of each gas occupies 22.4 L at STP.
54. Which of these choices is not an example of a plasma?
 (a) Aurora borealis
 (b) Fluorescent light bulb
 (c) Neon sign bulb
 (d) Incandescent light bulb
55. Amorphous solids
 (a) are more flexible at higher temperatures
 (b) include glasses
 (c) do not have specific melting point
 (d) all of the above
56. The evaporation of a liquid can be best carried out in a
 (a) beaker (b) china dish
 (c) test-tube (d) flask

57. SI unit of temperature is
 (a) Kelvin (b) Celsius
 (c) Both (a) and (b) (d) None of these
58. When liquid starts boiling, further heat energy which is supplied
 (a) is lost to the surrounding as such
 (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 vaporization by the liquid
59. The forces of attraction between the particles of matter is maximum in
 (a) iron rod (b) kerosene oil
 (c) glycerine (d) dry air
60. The volume of a gas at constant pressure
 (a) increases with increase in temperature
 (b) decreases with increase in temperature
 (c) remains constant at all temperatures
 (d) increases with decrease in temperature.
61. Which of the following substances has the highest density?
 (a) Water (b) Kerosene oil
 (c) Iron (d) Lead
62. The substance having the maximum tendency to flow is
 (a) water (b) sodium
 (c) sodium chloride (d) chlorine
63. 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.
64. Which of the following does not make sense?
 (a) Solids have fixed shape and fixed volume.
 (b) We can easily compress a liquid but not a gas.
 (c) Solids have negligible kinetic energy of the particles.
 (d) Property of diffusion is maximum in the gaseous state.
65. 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) no change in b.pt.
 (d) all may be correct
66. Which is the most favorable condition for liquefaction of ammonia?
 (a) High pressure, high temperature
 (b) High pressure, low temperature
 (c) Low pressure, low temperature
 (d) Low pressure, high temperature
67. The unit of latent heat is
 (a) joules per kilogram
 (b) calories per gram per 0°C
 (c) ergs per K
 (d) all of these
68. Latent heat of vaporization is used to
 (a) overcome the forces of attraction between molecules in solid state.
 (b) increase the kinetic energy of molecules in liquid state.
 (c) overcome the forces of attraction between molecules in liquid state.
 (d) increase the kinetic energy of molecules in vapor state.
69. The rate of diffusion decreases
 (a) with increase in temperature
 (b) with increase in kinetic energy of molecules
 (c) with decrease in temperature
 (d) no effect of temperature.
70. Liquefaction of a gas can be caused by
 (a) increase in kinetic energy of molecules
 (b) decrease in interparticle separation
 (c) both (a) and (b) (d) neither (a) nor (b).
71. Dry ice on heating produces
 (a) liquid CO_2 (b) liquid water
 (c) gaseous CO_2 (d) water vapor
72. What type of a process is evaporation?
 (a) Exothermic (b) Endothermic
 (c) Photochemical (d) Biochemical
73. In summer, white or light colored clothes are preferred to dark colored clothes because
 (a) white colour absorbs less heat
 (b) black colour or dark colours absorb less heat
 (c) white clothes look good
 (d) dark colored clothes are more comfortable.
74. Which of the following statements best explains why a closed balloon filled with helium gas rises in air?
 (a) Helium is a monatomic gas, whereas nearly all the molecules that make up air, such as nitrogen and oxygen, are diatomic
 (b) The average speed of helium atoms is higher than the average speeds of air molecules, and the higher speed of collisions

with the balloon walls propels the balloon upward

(c) Because the helium has a lower molar mass than the average air molecule, the helium gas is less dense than air

(d) Because helium has a lower molar mass than the average air molecule, the helium atoms are in faster motion. This means that the temperature of the helium is higher than the air temperature. Hot gases tend to rise.

75. Boyle's law states that the
- (a) pressure of a gas is directly proportional to the temperature at constant volume
 - (b) pressure of a gas is inversely proportional to the volume at constant temperature
 - (c) volume is directly proportional to the temperature at constant pressure
 - (d) none of the above.
76. A gas which obeys the gas laws is known as
- (a) an ideal gas
 - (b) a heavier gas
 - (c) a lighter gas
 - (d) a real gas.

FILL IN THE BLANKS

1. Liquids take the shape of the.....
2. Liquids have..... density than gases.
3. The temperature at which a liquid changes into gas/vapour is called.....
4. Intermolecular space in solids is..... than that of liquids.
5. Evaporation takes place from the.....of the liquid, while boiling takes place from the.....of the liquid.
6. Intermolecular forces of attraction are.....in solids,..... in liquids and..... in gases.
7. Gases can be compressed by applyingand lowering.....
8. Liquid and..... states are fluid states.
9. Mass occupied by a solid per unit volume is called..... of solid.
10. The smell of perfume gradually spreads across a room due to.....
11. Latent heat of fusion is the amount of heat energy required to change 1 kg of solid into liquid at its
12. Evaporation causes.....
13. is the change of gaseous state into solid without going through liquid state and vice versa.

14. Gases at higher temperature have generally..... kinetic energy as compared to low temperature.
15. solids have sharp melting points.
16. As the volume of a specific amount of a gas decreases, the pressure.....
17. metal is liquid at room temperature
18. Density is measured in.....
19. In solid state, particles are packed..... an are unable to
20. When a solid is heated, the forces of attraction between the particles are.....by an increased..... of the particles

TRUE OR FALSE

1. The intermolecular forces in the liquid state a substance are stronger than those in solid state
2. The volume of a gas expands on heating.
3. Boiling is a bulk phenomenon,
4. Latent heat of vaporization is the heat energy required to change 1 kg of a liquid to gas at atmospheric pressure at its melting point.
5. The molecules of a gas are in constant motion.
6. All materials change from solid to liquid to gas as the temperature increases.
7. Evaporation and boiling are the same process because molecules move from a liquid to gas phase.
8. LNG is compressed nitrogen gas.
9. Fusion is a change of solid state to liquid state.
10. A system that changes from a solid state to a liquid state gains energy.
11. Gases have highest rate of diffusion among all the three states of matter.
12. Solid CO_2 is an example of ionic solid.
13. Higher fluidity and high rigidity are characteristics of solids.
14. Ammonium chloride sublimes on heating.
15. Under normal conditions of temperature and pressure, the matter exists in four states.
16. Plasma state of matter exists at low temperature.
17. Gas molecules are unevenly distributed in the atmosphere.

18. The plasma glows in a special colour depending on the amount of electricity passed through the gas.
19. During the phase change, from solid to liquid or from liquid to gas, the temperature remains constant.
20. Few substances like calcium carbonate (a solid at room temperature) cannot be melted or vaporized.

MATRIX MATCH TYPE

In this section, each question contains statements given in a two columns which have to be matched. Statements (A, B, C, and D) in Column-I have to be matched with statements D (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.

	p	q	r	s
A	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
B	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
C	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
D	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

1. **Column I**
 (A) Liquid \rightarrow solid
 (B) Solid \rightarrow gas
 (C) Gas \rightarrow liquid
 (D) Gas \rightarrow solid
- Column II**
 (p) Condensation
 (q) Sublimation
 (r) Solidification
2. **Column I**
 (A) Increase in surface area
 (B) Decrease in temperature
 (C) Evaporation
 (D) Boiling phenomenon
- Column II**
 (p) Evaporation increases
 (q) Evaporation decreases
 (r) Bulk phenomenon
 (s) Surface
3. **Column I**
 (A) 300 K
 (B) 573 K
 (C) 646 K
 (D) 210 K
- Column II**
 (p) -63°C
 (q) 300°C
 (r) 27°C
 (s) 373°C
4. **Column I**
 (A) In liquids, particles are held together
 (B) Liquids can be compressed
 (C) In gases, particles are held together
- Column II**
 (p) Slightly
 (q) Less firmly
 (r) Most firmly

- (D) In solids, particles are held together (s) Least firmly

5. **Column I**
 (A) Liquid
 (B) Solid
 (C) Plasma
 (D) BEC
- Column II**
 (p) Definite shape
 (q) Definite volume
 (r) Super low density
 (s) Super energetic
6. **Column I**
 (A) Particles move randomly
 (B) Layers can slide over each other
 (C) Becomes solid under pressure
 (D) Particles are not free to move
- Column II**
 (p) Water
 (q) Sugar
 (r) Nitrogen
 (s) Carbon dioxide

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:** During evaporation of liquids the temperature remains unaffected
Reason: Kinetic energy of the molecules is directly proportional to absolute temperature.
2. **Assertion:** Camphor disappears without leaving any residue.
Reason: Camphor undergoes sublimation.
3. **Assertion:** The process of diffusion is always followed by effusion,
Reason: Both diffusion and effusion deal with spreading of gas.
4. **Assertion:** HCl diffuses faster than ammonia.
Reason: Rate of diffusion of a gas is inversely proportional to the square root of its density.
5. **Assertion:** Liquids diffuse less easily as compared to gases.
Reason: Intermolecular forces are greater in gases.
6. **Assertion:** A drop of liquid acquires spherical shape.
Reason: It does so because of capillary action.

7. **Assertion:** Glass is an amorphous solid.
Reason: Glass has irregular, random arrangement of atoms.
8. **Assertion:** Ionic solids conduct electricity in solid state.
Reason: They are made up of cations and anions.
9. **Assertion:** Ice floats on the surface of water.
Reason: The density of both water and ice is same.
10. **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.
11. **Assertion:** The rate of evaporation increases with increase in temperature.
Reason: Increase in temperature increases the kinetic energy of the particles.
12. **Assertion:** Solids do not diffuse in air.
Reason: The particles are closely packed in solids.
13. **Assertion:** It is easier to cook food at high altitudes.
Reason: The boiling point of water decreases at high altitudes.
14. **Assertion:** Cohesive forces keep the molecules together.
Reason: Evaporation is the escape of the molecules from the liquid state.
15. **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 vaporization.
16. **Assertion:** The conversion of a gas directly into solid is called condensation.
Reason: Naphthalene does not leave any residue when kept open for some time.
17. **Assertion:** At normal pressure (1atm) the boiling point of water is 100°C or 373.15 K.
Reason: As the pressure increases, boiling point of water also increases.
18. **Assertion:** The melting point of ice is 0°C or 273.15 K.
Reason: The conversion of a solid into liquid is also called fusion of the solid.
19. **Assertion:** The term vapors 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 vapors.

20. **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.