I. Objective Questions

A. Multiple Choice Questions:

1: A few substances are grouped in increasing order of their particle's 'forces of attraction.' Which of the following is the correct order?

A. Water, oxygen, chalk
B. Salt, juice, wind
C. Nitrogen, water, sugar
D. Air, salt, oil

Answer: c) Nitrogen, water, sugar

Explanation: Particles in solids are close together in an ordered manner, with little room for mobility. Particles in liquids are close together but have the ability to move about. In contrast to solid or liquid phases, gases have far apart particles that move easily and quickly.

This means that solids have strong forces of attraction between particles, whereas gases have weak forces of attraction. Liquids, on the other hand, are halfway between solids and liquids.

Solids: Chalk,salt and sugar

Liquids: Water, juice and oil

Gases: Nitrogen,oxygen,wind and air.

The correct order will be Nitrogen<Water<Sugar

2. A form of matter has no fixed shape and no fixed volume. An example of this form of matter is:

A. Petrol
B. Iron
C. Krypton
D. Carbon steel

Answer: c) Krypton

Explanation: Gases have neither a fixed volume nor a fixed shape. They take up the entire volume of the container in which they are placed. Krypton is a kind of gas. Petrol is a liquid. Solids are iron and steel.

3: Combustibility is a

A. Physical property
B. Reactive Property
C. Chemical Property
D. Not a property

Answer: c) Chemical property

Explanation: A chemical change is required for the measurement or observation of chemical properties. Physical qualities can be measured without a chemical change occurring. Chemical characteristics include acidity or basicity, combustibility etc.

4. CO_2 can be easily liquified and even solidified because
A. It has weak forces of attraction
B. It has comparatively more force of attraction than other gases
C. It has more intermolecular space
D. It is present in atmosphere

Answer: (a) It has weak forces of attraction

Explanation: Carbon dioxide is a gas and has a weak intermolecular force of attraction between its molecules. It can be easily solidified and even liquefied because it has a low melting point and low boiling point.

5. Under which of the following conditions we can boil water at room temperature?
A. At low pressure
B. At high pressure
C. At very high pressure
D. At atmospheric pressure

Explanation: We can boil water **at room temperature at low pressure**. By reducing the pressure, the boiling point decreases so that the water begins to boil at room temperature. The boiling point of a liquid is defined as the temperature at which the vapour pressure of the liquid is equal to the external pressure.

6. Which of the following is a characteristic of a liquid?

A. Has a definite shape and volume
B. Takes the shape of its container
C. Neither has a definite shape nor a definite volume
D. Has a definite shape but no definite volume

Answer: b) Takes the shape of its container

7. What is the state of matter characterized by having no definite shape or volume?

A. Solid
B. Liquid
C. Gas
D. Plasma

Answer: c) Gas

8. What is the freezing point of water in Celsius?

a) 0°C b) 100°C c) -273°C d) 373°C

Answer: a) 0°C

9. Which state of matter has the least kinetic energy?

a) Solid b) Liquid c) Gas d) Plasma

Answer: a) Solid

10. Which of the following is a characteristic of a solid?

a) Takes the shape of its container

b) Has a definite volume but no definite shape

c) Has neither a definite shape nor a definite volume

d) Has a definite shape and volume

Answer: d) Has a definite shape and volume

11. What happens to the volume of a substance when it changes from a solid to a liquid?

A. It decreases
B. It increases
C. It remains the same
D. It cannot be determined

Answer: c) It remains the same

12. Which of the following is NOT a state of matter?

a) Solid b) Gas c) Plasma d) Energy

Answer: d) Energy

13. Which of the following is a chemical property of matter?

a) Boiling point b) Melting point c) Density d) Reactivity with acid

Answer: d) Reactivity with acid

B. Fill in the blanks:

(a) _____ properties can be measured or observed without changing the identity or the composition of the substance.

(b) Diffusion of solids are _____ than liquids.

(c) Molecules in a _____ are packed very closely.

(d) A gas on cooling liquifies to the_____.

(e) The three states of matter are interconvertible by changing the conditions of _____ and _____.

(f) When a gas is cooled, its molecules _____ energy.

Answers:

a) Physical
b) Lesser
c) Solid
d) Liquid
e) Temperature, pressure
f) Loose

II. Short Answer Questions:

Q1. Give two examples for each of the following:

a) The substances which sublime.
b) The substances which do not change their state on heating.

Solution:

a) Camphor, iodine, naphthalene, dry ice (solid carbon dioxide), etc.

b) Gases do not change their state on heating. For example, O_2.

Q2. State which of the three states of matter i.e. solids, liquids or gases - have

I. No definite volume
II. A definite shape
III. High density
IV. No free surfaces
V. Particles which diffuse very easily.

Answer

I. No definite volume — gases
II. A definite shape — solids
III. High density — solids .
IV. No free surfaces — gases
V. Particles which diffuse very easily — gases

Q3. State in which of the following examples i.e. a piece of wood, water, a light gas is the -

(a) Inter-particle space maximum

(b) Inter-particle attraction maximum

(c) Energy possessed by particles of matter, very large.

Answer:

(a) Inter-particle space maximum — a light gas

(b) Inter-particle attraction maximum — a piece of wood

(c) Energy possessed by particles of matter, very large — a light gas

Q4. Why can a piece of chalk be broken easily into smaller pieces while a coal piece cannot be broken easily?

Answer: The particles of matter have force acting between them. This force keeps the particles together. The strength of this force of attraction is lesser in chalk, hence it could be broken easily into smaller pieces. But the strength of inter-molecular force of attraction is very strong in coal, therefore it is not possible to break them into small pieces.

III. Long Answer Questions:

Q1. State the main postulates of the kinetic theory with special reference to -

(a) Inter-particle space

(b) Inter-particle attraction

(c) Energy possessed by particles of matter.

Answer:

(a) **Inter-particle space** — The particles are arranged in a way such that, they have spaces between them. i.e. inter-particle space.

(b) **Inter-particle attraction** — All particles attract each other with a force which is

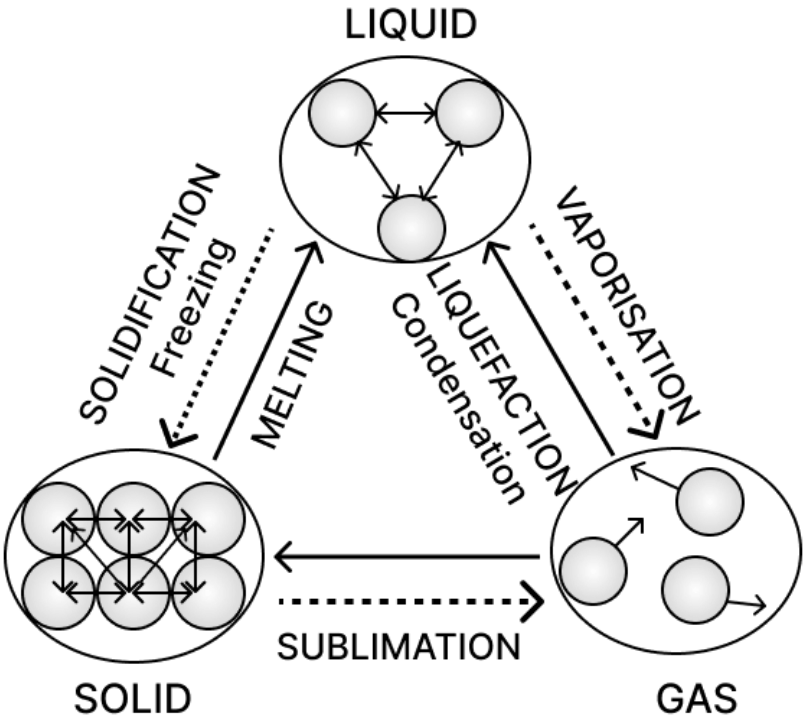
- maximum - if the particles are close to each other &
- minimum - if the particles are at a distance from each other.

(c) **Energy possessed by particles of matter** — Particles are in continuous motion and hence possess energy called Kinetic Energy. Application of heat increases Kinetic Energy of particles which then move more randomly.

Q2. Draw a labelled schematic diagram representing the terms - (a) to (e) involved in the inter-conversion of matter.

Answer:

Below labelled diagram represents the different terms involved in the inter-conversion of matter:



Change of state of matter - kinetic theory

Q3. Give reasons for the following:

1. Particles of matter possess energy called kinetic energy.
2. Solids cannot be compressed, but gases are highly compressible.
3. Kinetic energy of molecules of gases is very large & of solids, the least.
4. On heating a sublimable solid, the molecules break free & escape from surface of the solid directly into vapour.
5. Particles of matter move more rapidly on application of heat.

Answer:

1. Particles of matter are in continuous motion and hence possess energy called kinetic energy.
2. As inter-particle space in solids is minimum, hence, they cannot be compressed. Gases on the other hand, have very large inter-particle space, hence are highly compressible.
3. As inter-particle space in gases is very large and inter-particle attraction is negligible, hence they are in random motion all the time and possess high kinetic energy whereas solids have minimum inter-particle space, maximum inter-particle attraction and they can move only about their own position. Hence they have least kinetic energy.
4. Sublimable solid have very low force of attraction between their particles. On heating, these solids overcome the inter-particle attraction and the molecules break free & escape from surface of the solid directly into vapour.
5. Application of heat increases the kinetic energy of the particles which then move more randomly.