MATTER

Exercise

(A) 1. True or False

a) True
b) False
c) False
d) True
e) False
f) False
g) False
h) False
i) False
j) True

2. F I B

a) all
b) Freezing
c) sublimation
d) Melting point
e) molecule
f) motion, Kinetic energy
g) gases, liquids, solids
h) solids, liquids, gases

3) Column A

a) Molecules
b) 100°C
c) 0°C
d) All all temperatures
e) Camphor

Column B

i) water boils
ii) evapouration
iii) change from solid to gas
iv) matter
v) water freezes

4. Select the correct alternative:

a) The inter-molecular force is maximum in:

Ans- i) Solids

b) The intermolecular space is maximum in:

Ans- iii) gases

c) The molecules can move freely anywhere in:

Ans- i) gases

d) The molecules move only within the boundary in:

ans-i) liquids

e) The temperature at which a liquid gets converted into its vapour state is called its:

ans-ii) Boiling point

f) Rapid conversion of water into steam is an example of:

ans- iv) Vaporisation

g) Evaporation takes place from the:

ans- i) surface of liquid

h) Boiling takes place from:

ans- ii) throughout the liquid

(B) Short / long answer questions:

1ans- Matter is something which occupies space, has mass and can be perceived by our senses.

Matter is composed of tiny particles, called molecules.

2 ans- Three properties of molecules of matter are :-

* They are very small in size.
* They have spaces between them.
* They are in constant motion as they possess kinetic energy.

3 ans- The separation between two molecules in the three states of matter is called intermolecular space. The separation between two molecules in a solid (i.e. inter-molecular spacing) is very small.

4 ans- The molecules of matter exerted a force of attraction on each other. This force of attraction is called inter-molecular force.

The force of attraction between the molecules of a solid is very strong, while it is less strong between the molecules of a liquid and negligible between the molecules of a gas.

Sol:- a) Solids have definite shape and definite volume.

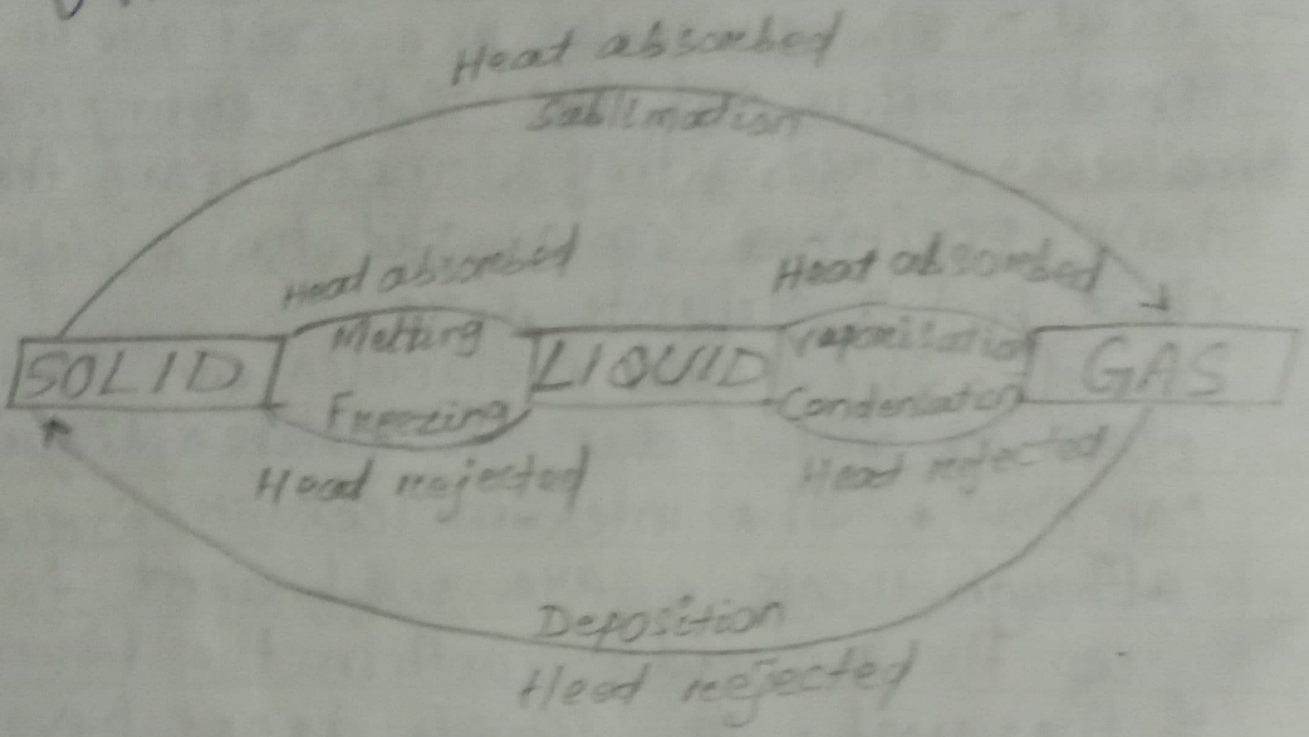
b) Liquids have definite volume but no definite shape.

Sol:- Solid - The molecules in a solid are in fixed positions and due to the strong inter-molecular forces, they donot leave their positions. so a solid has a definite shape and a definite size.

Liquid - The liquid molecules can slide over one another due to which a liquid can flow. The inter-molecular forces, although weak, are sufficient to keep the molecules within the boundary of the vessel. so, liquids donot have a definite shape, but they have a definite volume.

Gas - The gas molecules are quiet free to move here and there in the space available to them because of their weak intermolecular forces. This is why, the gases have neither a definite shape nor a definite volume.

Ans- The process of change from one state to another state either by absorption or rejection of heat at a constant temperature is called change of state.



Ans- The temperature at which a solid changes into liquid without further increase in temperature is called the melting point. For ex- Ice (solid) at 0°C melts to form water (liquid) at 0°C by the absorption of heat.

The temperature at which a liquid changes into vapour without further increase in temperature is called the boiling point.

For ex- water (liquid) at 100°C changes to

8ans steam (gas) at 100°C by absorption of heat.

9 ans- Condensation - The change from vapour state to liquid state at a constant temperature on rejecting heat (or on cooling) is called condensation. For ex- steam (gas or vapour) at 100°C condences to water (liquid) at 100°C on cooling (i.e. by rejecting heat).

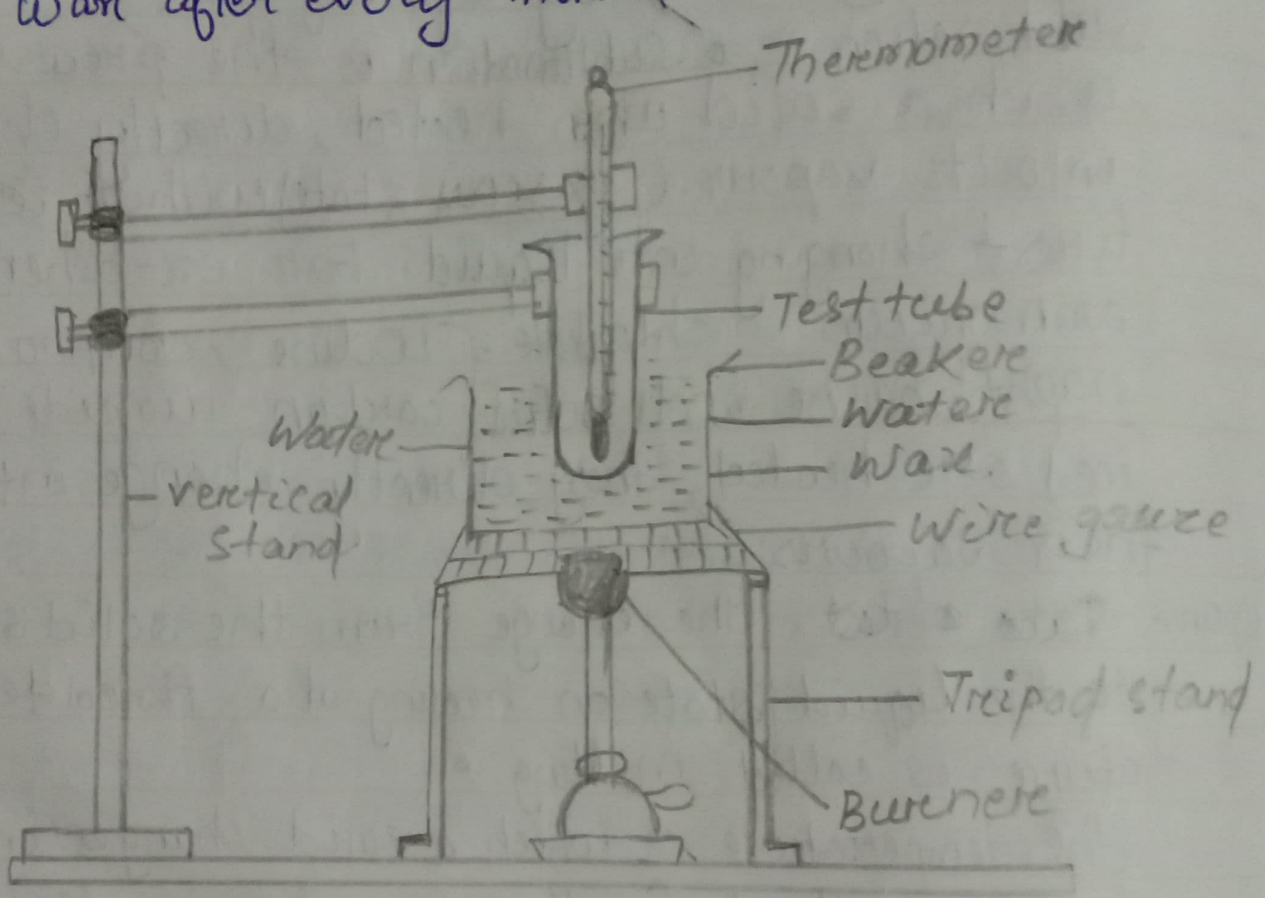
Sublimation - Sublimation is the process by which a solid when heated, directly changes into its vapour (gaseous state) without first changing into liquid. For ex- when ammonium chloride, iodine, camphor, naphthalene and solid carbon dioxide (dry ice) are heated, they directly change into their vapours.

10 ans- The change from the solid state to the liquid state on heating at a fixed temperature is called melting.

The temperature at which a solid changes into liquid without further increase in temperature is called the melting point.

11 ans- Take a test tube. Put some wax in the test tube. clamp the test tube in a vertical stand and place the test tube in a

beaker of water placed on a wire guaze at a tripod stand. ② Clamp a thermometer on the same vertical stand and insert the thermometer in the test tube such that the bulb of the thermometer is inside the wax as shown in the figure. Heat the beaker over the flame of a burner and record the temperature of the wax after every minute.



Time (in minute)	Temperature of wax (in °C)
0	25
1	30
2	35
3	40
4	45
5	50
6	55
7	55
8	55
9	55
10	60
11	65
12	70

Conclusion : From the above observations, you will note that wax melts at 55°C during which heat is supplied. But temperature doesn't rise. Thus, the melting point of wax is 55°C. After the melting of the whole wax, the temperature begins to rise.

12. ans. The change from liquid state to gaseous (or vapour) state on heating at a constant temperature by absorption of heat is called vaporization.

The temperature at which a liquid changes into

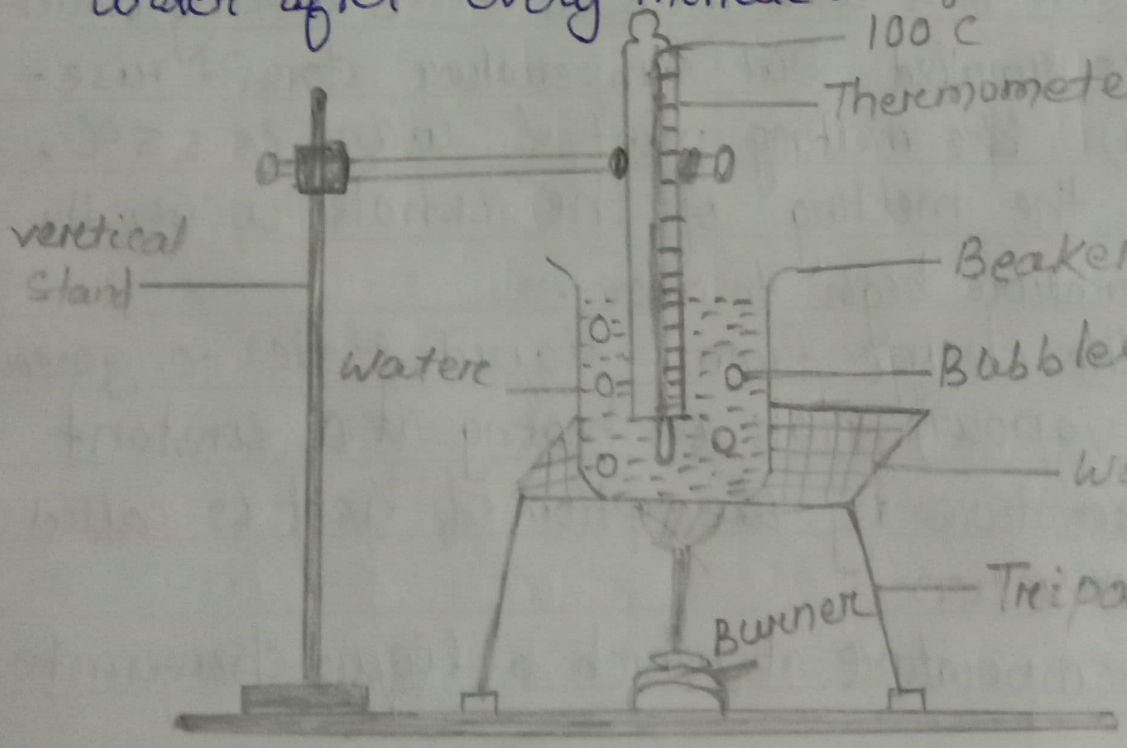
vapour without further increase in temperature is called the boiling point.

13 ans - The processes involved in the two cases are :-

* Evaporation
* Vaporization

14 ans - From the above observations the conclusion is melting point of ice is 0°C.

15 ans - Take a beaker. Pour some water in the beaker. Place the beaker on wire gauze placed over a tripod stand. Clamp a thermometer on a vertical stand and insert it in the beaker as shown in Figure. Heat the beaker over the flame of a burner and record the temperature of water after every minute.



You will notice that the temperature of water rises continuously till the water starts boiling at 100°C. Once the water starts boiling, its temperature does not rise any further, although the heat is still being supplied. Now the bubbles formed through the water are seen. At this temperature water begins to boil and changes into steam. Thus, the boiling point of water is 100°C.

16 ans- a) The melting point of ice = 0°C
b) The boiling point of water = 100°C

17 ans- The change of state from liquid to vapour at all temperatures from the surface of a liquid is called evapouration.

18 ans- The factors affecting the rate of evapouration are :-

* The temperature of liquid.
* The area of the exposed surface
* The nature of liquid

19 ans- In dry air, evaporation is faster than in humid air. This is why wet clothes dry faster in dry summer days than in rainy season.

20 ans - In the dish, the surface area of water increases and evaporation becomes faster. But in a bottle the surface area of water decreases and evaporation becomes slower.

21 ans. Volatile liquids with low boiling point such as alcohol, spirit, ether, etc evaporate much faster than water. This is why volatile liquids are stored in tightly closed bottles.

22 ans - The temperature of water rises continuously till the water starts boiling at 100°C. Once the water starts boiling, its temperature does not rise any further, although the heat is still being supplied. At this temperature water begins to boil and changes into steam. Thus, the boiling point of water is 100°C.

23 ans - The reason for cooling in evaporation is that when a liquid changes into vapour, it requires heat. This heat is supplied by the surroundings of the liquid.

24 ans - If a little alcohol (or spirit) is poured on the palm, it gives a soothing (or cooling) sensation. This shows that cooling is produced when a liquid evaporates. The ~~reason~~ reason for cooling in evaporation is that when a liquid changes into vapour, it requires heat.

This heat is supplied by the surroundings of the liquid.

25. ans- a) In summer, water gets cooled in an earthern pot (Surahi). The reason is that water seeps out on the surface through the pores in the pot and it evaporates. The heat required for evaporation is taken from water inside the pot which therefore gets cooled.

b) We often pour tea in a saucer to cool it faster. In the saucer, the surface area of tea increases and evaporation becomes faster.

26 ans- In summer, water gets cooled in an earthen pot. The reason is that water seeps out on the surface through the pores in the pot and it evaporates. The heat required for evaporation is taken from water inside the pot which therefore gets cooled.

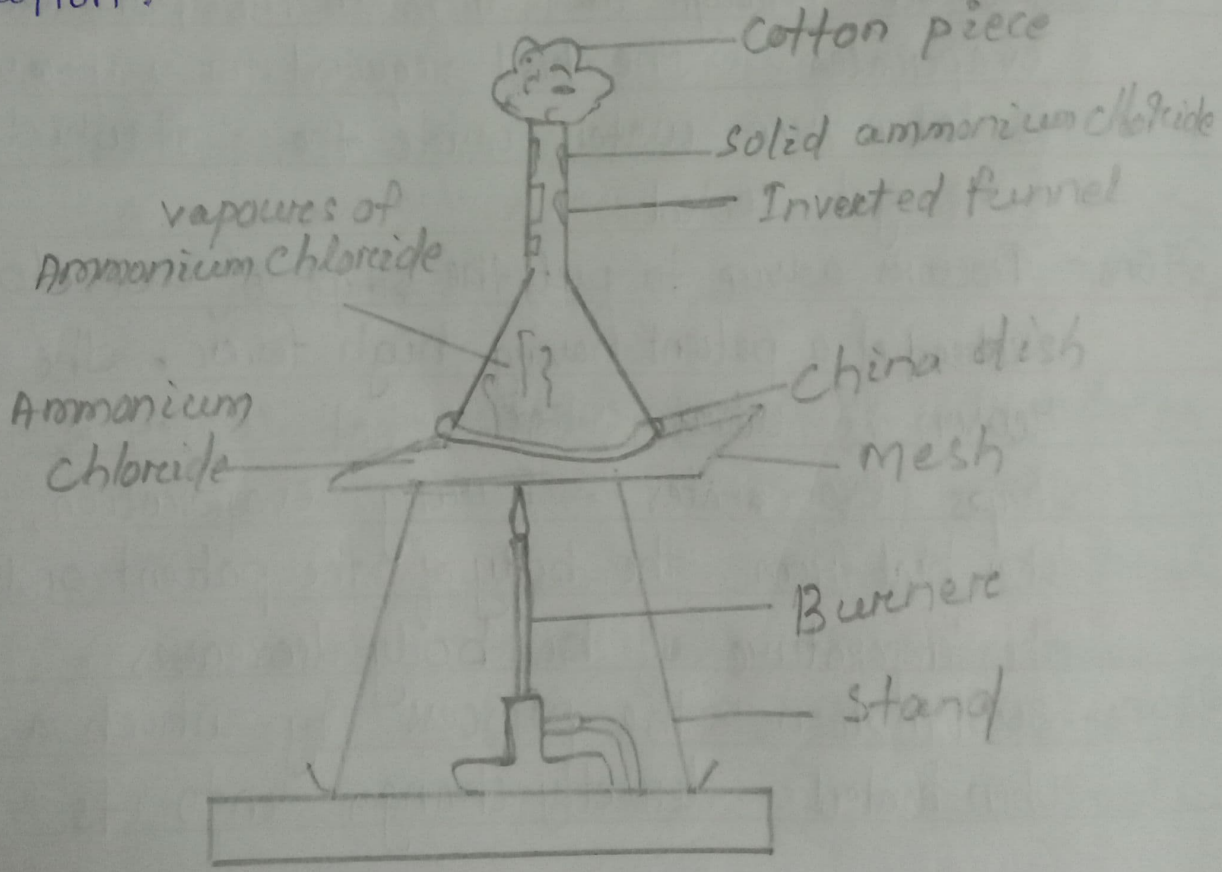
27 ans- Doctors advice to put the strips of wet cloth on the forehead of a patient having high fever. The reason is that water of the strips evaporates. During evaporation, water takes heat from the body of the patient and thus the temperature of his body decreases.

28 ans- Sublimation is the process by which a solid when heated, directly changes into its vapour

(gaseous state) without first changing into liquid. For ex- When ammonium chloride, iodine, camphor, naphthalene and solid carbondioxide (dry ice) are heated, they directly change into their vapours.

29 ans - Some times sublimation also takes place without heating. Naphthalene balls (or moth balls) which we use to protect wooden clothes from insects, directly changes into vapour and with time they become small in size.

30 ans - Take some camphor or ammonium chloride. Powder it. Keep the powder in a china dish. Now cover the china dish with an inverted funnel as shown in figure. Then close the end of funnel with a pieced cotton.



Now, place the dish on a wire mesh kept on a tripod stand to heat it by a burner. You will notice that the fumes (i.e. vapours) of ammonium chloride are seen in the funnel above the dish. These vapours upon rising, get cooled and change to solid ammonium chloride which gets deposited on the inner walls of the funnel. Thus, ammonium chloride on heating changes directly from solid to vapour and these vapours on cooling directly change to solid ammonium chloride.