10/4/24

CH-1
MATTER
TEST YOURSELF [EXERCISES]

[A] Objective Questions :

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

(2) (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		Column-B
(a)	⟷	(iv)
(b)	⟷	(i)
(c)	⟷	(v)
(d)	⟷	(ii)
(e)	⟷	(iii)

(4) (a) (i) (e) (ii)
(b) (iii) (f) (iv)
(c) (i) (g) (i)
(d) (ii) (h) (ii)

[B] Short / Long Answer Questions

(1) Matter is something that has mass, occupies space and perceived by our senses. Matter is composed of very tiny particles called anu or molecules which are made up of further small particles called Parmanu or atoms

(2) Three properties of molecules of matter -

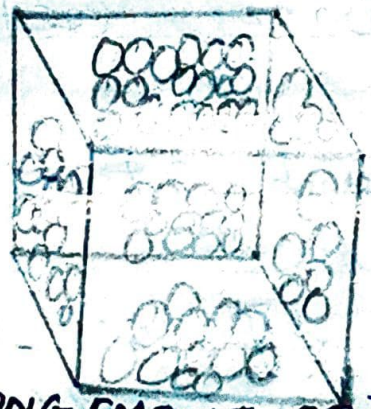
* Molecules are very small in size.
* They have spaces between them.
* They attract each other.

(3) The molecules of matter have spaces between them which is called as inter-molecular spaces. These spaces are maximum in gases, less in liquids and the least in solids.

(4) The molecules of matter exert a force of attraction on each other and ~~This~~ this force of attraction is called as inter-molecular force of attraction.
Inter-molecular force of attraction is maximum ~~is~~ in solids, less in liquids and least in gases.

(5) Correct statements are- Option (a) and Option (b).

(6)



ARRANGEMENT OF MOLECULES IN A SOLID.

MOLECULAR MODEL OF SOLIDS:-

1. Each solid is made up of very tiny Particles called molecules. These molecules are very small in size and they can be assumed to be like tiny rigid balls

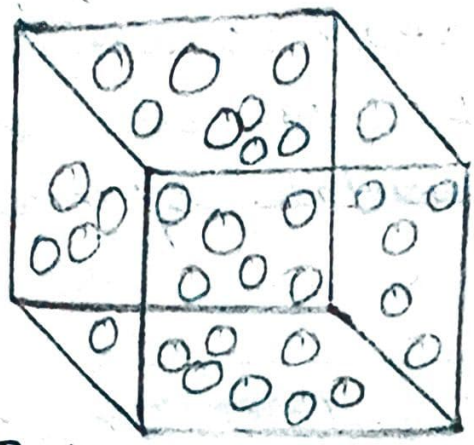
2. The separation between two molecules in a solid [i.e. inter-molecular spacing] is very small.

3. The molecules in a solid can only vibrate to & fro about their mean positions. They do not leave their positions.

4. The molecules in a solid are closely packed due to the strong attractive forces between them.

MOLECULAR MODEL OF LIQUIDS:-

1. Each liquid is made up of very tiny particles called molecules. These molecules are very small in size and they are not in a rigid arrangement.



ARRANGEMENT OF MOLECULES IN A LIQUID

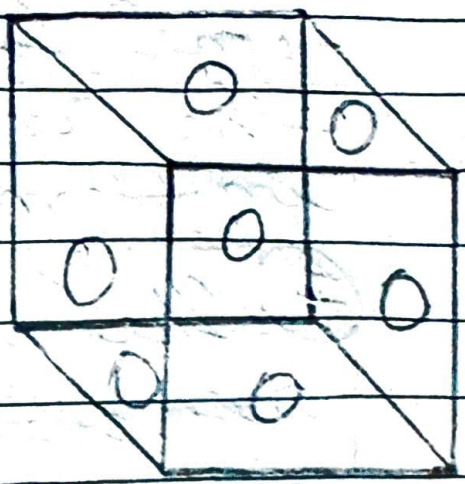
2. The inter-molecular spaces in liquids are more than in solids.

3. The liquid molecules can move about freely within the boundary of the vessel in which the liquid is kept.

4. The molecules in a liquid are less closely packed and their positions are not fixed as they are free to move within the boundary of the vessel. This is because the inter-molecular forces in a liquid are weak in comparison to that in solids.

MOLECULAR MODEL OF GASES:-

1. Like solids & liquids, gases are made up of very tiny particles called molecules. These molecules are very small in size and they can be assumed to be like rigid, homogeneous and perfectly elastic balls.



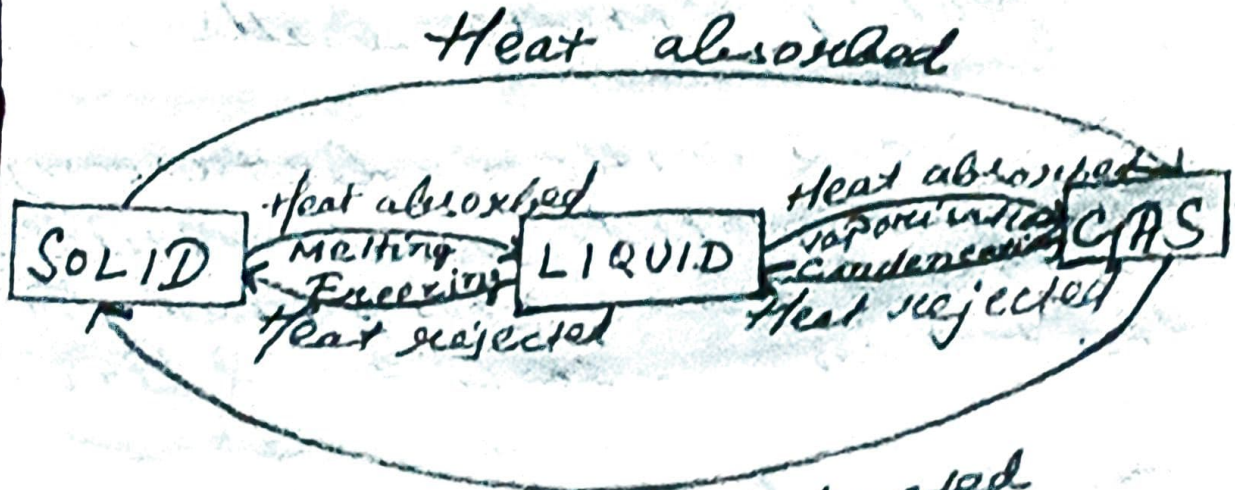
ARRANGEMENT OF MOLECULES IN A GAS.

2. The separation between the molecules is quite large as compared to that in solids & liquids.

3. The molecules in a gas can move about freely in the space available to them.

4. The molecules in a gas are wide apart and their positions are not fixed because the inter-molecular forces in them are very weak.

(7) 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.



CHANGE OF STATE

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(8)

MELTING POINT	BOILING POINT
* The temperature at which a solid changes into liquid without further increase in temperature is called melting point of a solid.	* The temperature at which a liquid when heated changes into vapour (gas) without further increase in temperature is called boiling point of a liquid.
* For example - ice (solid) at 0°C melts to form water (liquid) at 0°C by the absorption of heat.	* For example - water (liquid) at 100°C ~~boiled~~ when boiled at 100°C, water changes into vapour (or gas).

(9) When vapour is cooled it ~~cond~~ changes (or condenses) into liquid at the same fixed temperature. This process is called condensation.
Ex → The mirror in the bathroom during a shower becomes

foggy because warmer water vapour in the air hits the cooler surface of the mirror.

→ Having a cold soda on a hot day, we would observe the outside part of the can "sweats" means tiny droplets of water begin to appear outside part of the can. Water molecules in the air as a vapour hit the colder surface of the can and turn into liquid (water).

In some cases, on heating, a solid directly changes to its vapour or gaseous state, without changing into liquid. This process is called sublimation.

Ex- This process occurs in the case of camphor, iodine and naphthalene.

(10) Melting is the change from the solid state to the liquid state on heating at a fixed temperature. Melting point of a solid is the temperature at which a solid changes into liquid without further increase in temperature.
For example → Ice (solid) at 0°C melts to form water (liquid) at 0°C by the absorption of heat.

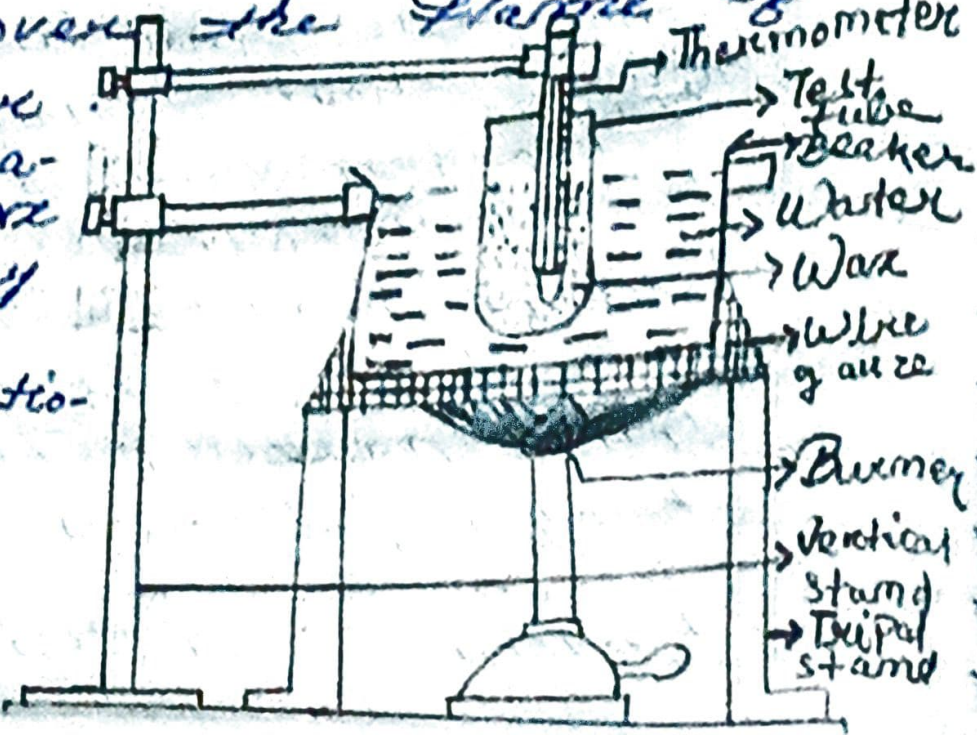
(11) Aim of the Experiment: To demonstrate that a substance absorbs heat during without change in its temperature.

Materials Required: Thermometer, Test Tube, Beaker, Water, Wax, Wire gauze, Tripod stand, Burner, Vertical stand.

Procedure: A test tube is taken.

Some wax is put in the test tube. The test tube is clamped in a vertical stand and the test tube is placed in a beaker of water which is placed on a wire gauze at a tripod stand. A thermometer is clamped in the same vertical stand and the thermometer is inserted in the test tube such that the bulb of the thermometer is inside the wax. The beaker is heated over the flame of a burner. The temperature of wax after every minute. The observations are recorded.

DIAGRAM :-
MELTING OF WAX -



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Observations:

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	75
12	70

Conclusion: From the above experiment and observations, we will note that wax melts at 55°C during which heat is supplied, but temperature does not rise. Thus, the melting melting of the whole wax, the temperature begins to rise.

(12) ⇒ 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 of liquid.

(13) (a) Boiling
(b) Evaporation

(14) We can conclude that the melting point of ice is $0^{\circ}C$.

(15) Aim of the experiment → To demonstrate that water absorbs heat during boiling at a constant temperature.

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Materials Required → Thermometer, Beaker, water, Wire gauze, Tripod stand, Burner, Vertical stand.

Procedure → A beaker is taken. Some water is poured in the beaker. The beaker is placed over a tripod stand. A thermometer is clamped in a Vertical stand and the beaker is inserted in it. The beaker is heated over the flame of a burner and the temperature of water is recorded after every minute.

Observation → We 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 due through the water are seen.
Conclusion -> At this temperature water begins to boil and changes into steam. Thus, the boiling point of water is 100°C. DIAGRAM - Next Plain Page.

(16) (a) 0°C
(b) 100°C.

(17) The change of state from liquid to vapour at all temperatures from the surface of a liquid is called evaporation.

(18) 3 factors which affect the rate of evaporation of a liquid -
* The temperature of liquid
* The flow of air above the liquid.

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* The area of the exposed surface.

(19) In dry air, evaporation is faster than in humid air, because when the air is humid, the air is already laden with moisture so it can't hold more water particles. This is why wet clothes dry more quickly on a warm dry day than on a cold humid day.

(20) The area of the exposed surface is one of the factor which determines the rate of evaporation. The rate of evaporation increases if the area of surface exposed increases. The area of the exposed surface is more of a dish than a bottle. So, Water in a dish evaporates faster than in a bottle.

(21) Volatile liquid such as alcohol and spirit have low boiling point, thus they evaporate much faster than water. This is why volatile liquids are stored in tightly closed bottles.

(22) We can conclude that the boiling point of water is 100°C.

(23) Question No. - 15 → DIAGRAM.

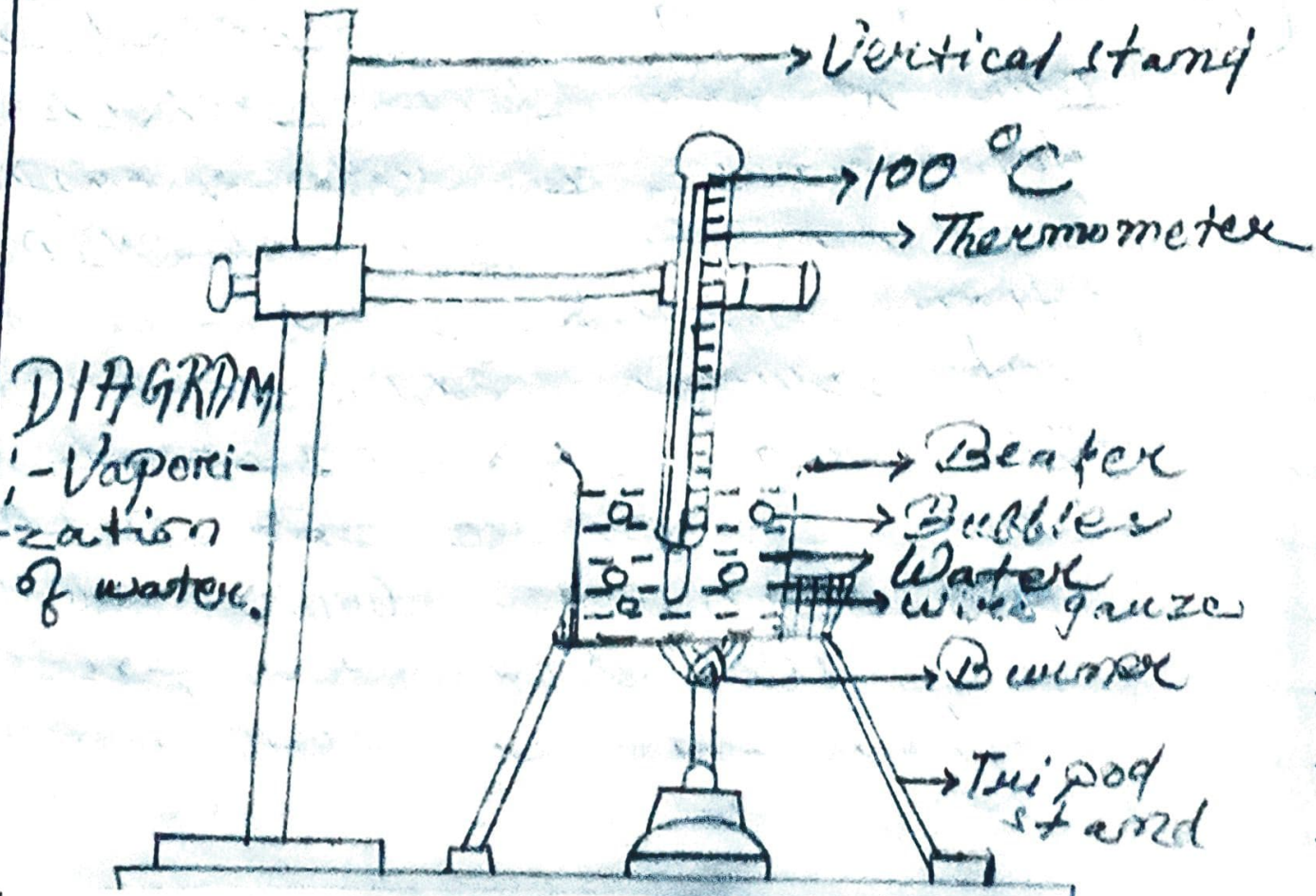

DIAGRAM :- Vaporization of water.

(23) When a liquid changes into vapour (gaseous state), it requires heat and this heat is supplied by the surroundings of the liquid. This results in fall in temperature in the surroundings or it induces a cooling effect.

(24) When a liquid evaporates, it requires heat which it get from its surroundings itself.
Ex- If a little alcohol or sprit is poured on the palm, it gives a cooling or soothing sensation. Here, the heat is supplied by Palm (surrounding of the liquid). This results in fall in temperature (or cooling) in the surroundings.

Applications of Evaporation :-

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

* Evaporation of sweat from our body helps to maintain the body temperature at ~~37°C~~ 37°C or 98.6°F. When sweat evaporates, it requires heat ~~water~~ which it takes away from our body. As a result, temperature falls to keep the ~~on~~ body at 37°C.

(26) In hot summer days, water remains cool in earthen pots because water seeps out on the surface through the pores in the pot and it gets evaporated. The heat required for evaporation is taken from water inside the pot which therefore gets cooled.

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(27) Water of the strips evaporates. During evaporation, water takes heat from the body of the patient and thus the temperature of his body decreases. Thus, Doctors advice to put the strips of wet cloth on the forehead of a patient having high fever.

(28) Sublimation is the process by which a solid when heated, directly changes into its vapour (gaseous state) and without first changing into liquid.

Ex - Sublimation takes place in the case of dry ice. Carbon dioxide gas when cooled converts into solid carbon dioxide which is called dry ice.

(29) Sometimes sublimation also takes place without heating. Naphthalene balls (or moth balls) directly changes into vapour and the size becomes smaller when left open.

(30) Aim of the Experiment:- To demonstrate the process of sublimation.

Materials Required :- Cotton piece, ammonium chloride, Funnel, China dish, Mesh, Burner, Stand.

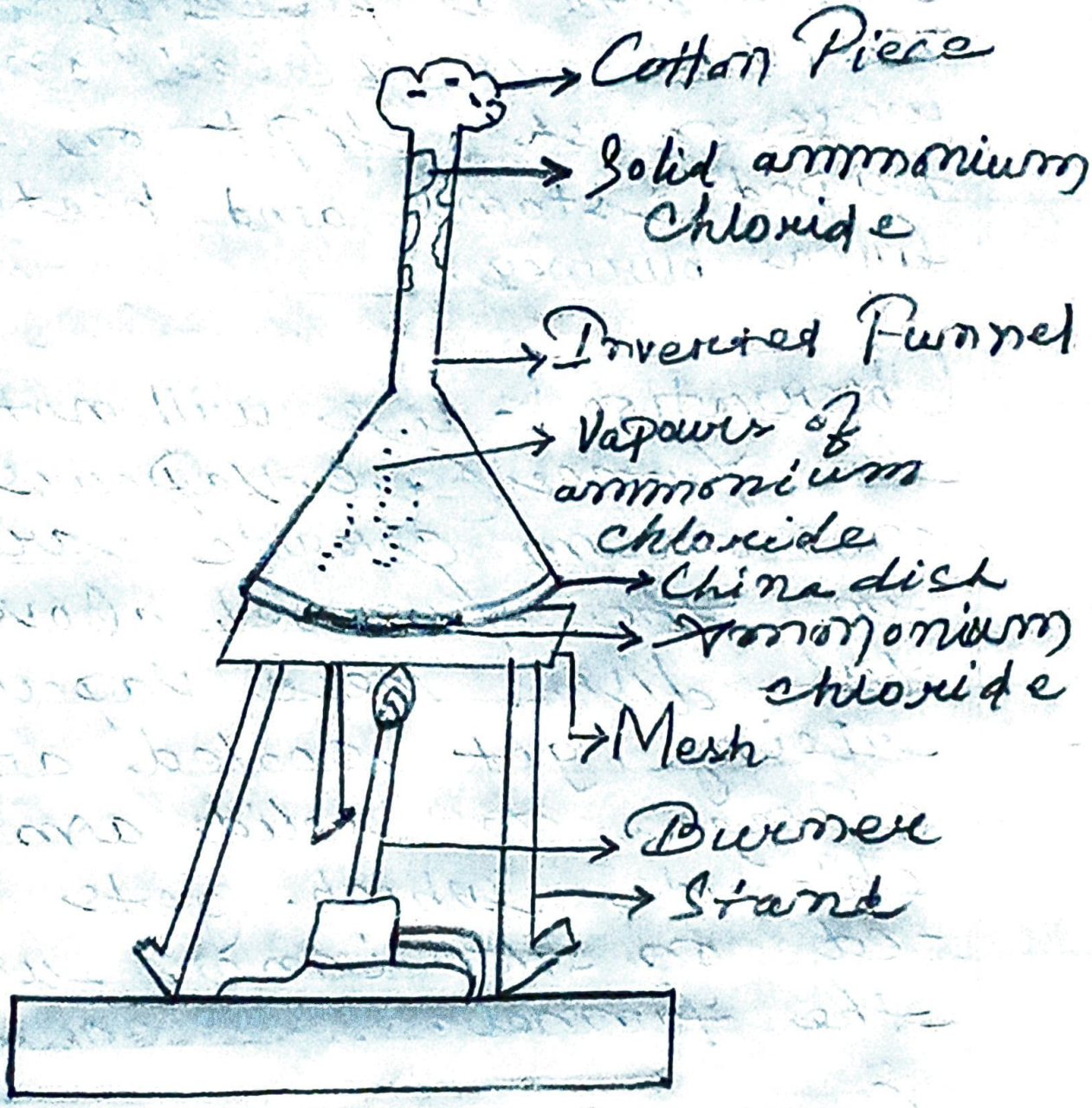
Prodecure :- Ammonium chloride is taken. It is powdered. The powder is kept in a china dish. Now then, the china dish is covered with an inverted funnel. The end of the funnel is

closed with a piece of cotton. The dish is placed on a wire mesh kept on a tripod stand and heated it by a burner.

Observation :- We will notice that the fumes (i.e. vapours) of ammonium chloride are seen in the funnel above the ~~dish~~ dish. These vapours upon rising, get cooled and change to solid ammonium chloride which gets deposit-ed on the inner walls of the funnel.

Conclusion - Thus, ammonium chloride on heating, changes directly from solid to vapour and these vapours on cooling directly change to solid ammonium chloride.

DIAGRAM :-



SUBLIMATION & DEPOSITION OF AMMONIUM CHLORIDE