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[GROUP- C]

(i) DIFFUSION.

Group 'c'

Diffusion

Diffusion [Diffusus = to spread] → "movement of molecules or ions of a gas, liquid or solid from an area of their greater concentration to an area of their lesser concentration is called diffusion."

To diffuse means to spread, to blow out, to extend in all directions, to disperse. It can be simply defined "as the movement of particles of matter due to their own kinetic energy". The direction of movement of these particles is from the region of their higher concentration to the region of their lower concentration in order to equalise the concentration of two regions. Even after eq. equilibrium is reached the diffusion continued through it is not detectable because the movement continues in both the directions at equal rates.

The diffusion of particles of one substance is quite independent of the

diffusion of the particles of other (2) substances. Neither the direction nor the rate of flow of particles of one substance is affected by the direction and flow of the particles of the other substances present in the same system. Each substance diffuses according to its own concentration gradient.

The rates of diffusion are determined by the factors such as relative density, temperature, concentration gradient and the concentration of the medium. Hydrogen diffuses four times as fast as oxygen and five times as fast as carbon dioxide. These rates being determined by the relative intensity of the gas. Rate in temperature increases the rate of diffusion, steeper the concentration gradient, higher the rate of diffusion and higher concentration of the medium through which diffusion occurs tends to lower the rate of diffusion.

Gases diffuse through gases, liquids and solids; liquids diffuse through gases, liquids and solids and solids diffuse through gases, liquids and solids. In some cases the rate may be quite fast as to be

- observed as belt, e.g.; diffusion of NH_3 into air or diffusion of potassium permanganate into water but in some cases rate may be very slow and may take hundreds of years, such as diffusion of solid into solid. e.g.; copper into zinc, if the bars of two metals are kept upon the anodes.

The various examples of diffusion of different states of matter can be-

- i) Gas into gas \rightarrow diffusion of ammonia into air.
- ii) Gas into liquid \rightarrow foam
- iii) Gas into solid \rightarrow precious stones
- iv) Liquid into gas \rightarrow clouds
- v) Liquid into liquid \rightarrow diffusion of alcohol into water.
- vi) Liquid into solid \rightarrow diffusion of KOH solution into solidified agar containing phenolphthalein but indicating the movement of KOH solution.
- vii) Solid into gas \rightarrow smoke
- viii) Solid into liquid \rightarrow diffusion of KMnO_4 crystal placed into water.
- ix) Solid into solid \rightarrow diffusion of copper into zinc and zinc into copper.

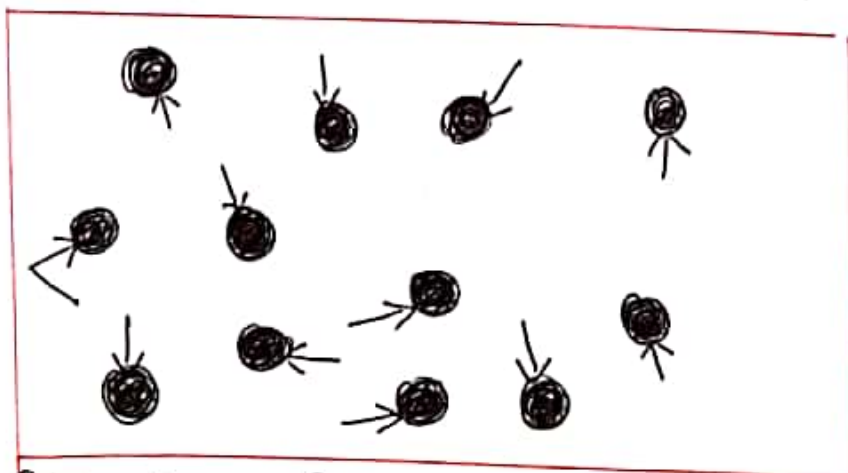
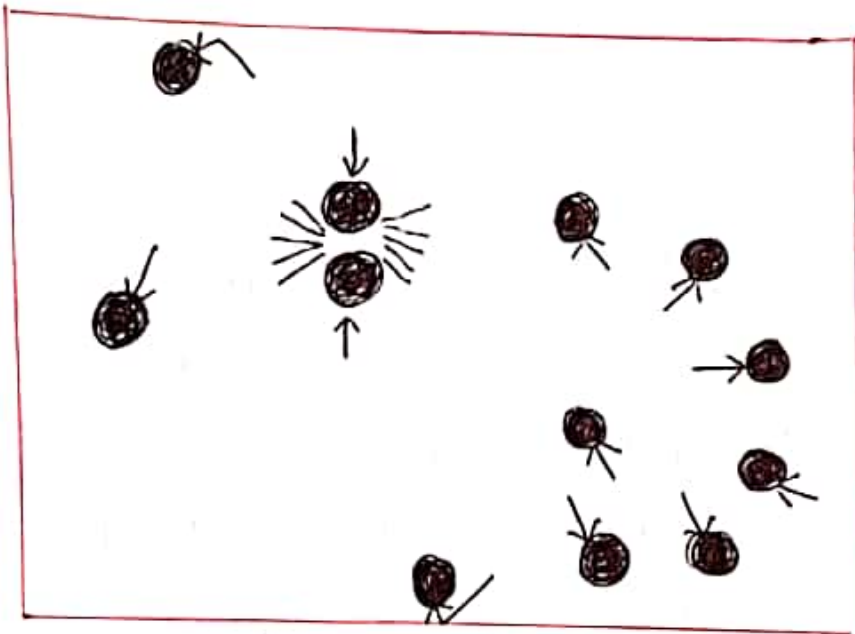
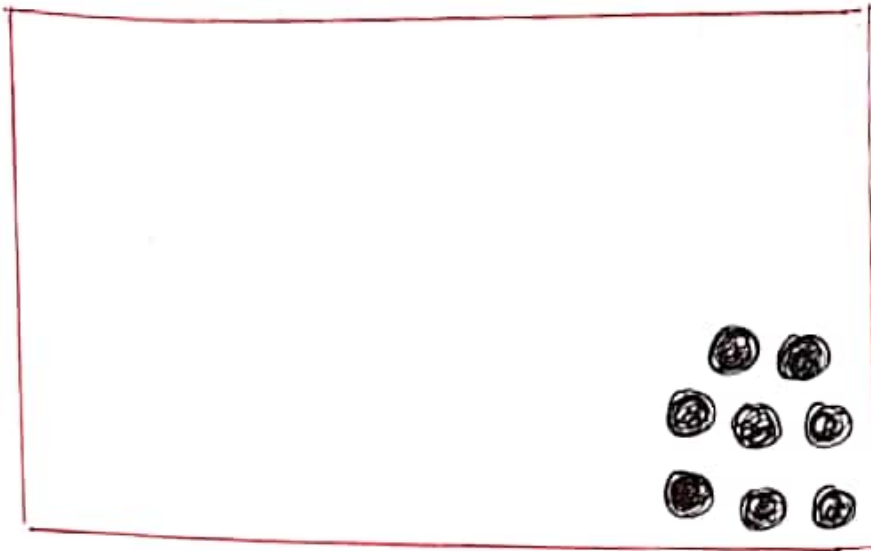


Figure \Rightarrow Representation of diffusion - which is the movement of molecules or ions of - gas, liquid from an area of their greater concentration to an area of their lesser concentration.

Diffusion pressure

(5)

It is a hypothetical term describing the potential ability of a gas, liquid or a solid to diffuse from an area of its higher concentration to an area of lesser concentration. A gas filled balloon has a greater diffusion pressure than the gas that surrounds it. The gas combined in the balloon due to this greater diffusion pressure will diffuse into the surrounding gas, if the balloon is broken.

Differences between diffusion and osmosis

<u>Diffusion</u>	<u>Osmosis</u>
i) Presence of semipermeable membrane is not required.	i) It is a special type of diffusion in which a semipermeable membrane is required between the two solutions.
ii) Diffusion may occur in any medium, it may be between solid, liquid or gas.	ii) Osmosis occurs in liquid medium.
iii) In diffusion, a net downward movement of a given substance from the higher	iii) In osmosis, diffusion of only solvent molecules from low concentration of solution to higher concentration.

Concentration to lower or lesser concentration is bound.

Concentration of solution ⁽⁶⁾ takes place.

Importances of diffusion in plants

Diffusion is most important process to maintain the vital activities of the cells.

- i) It helps in removing the waste products from the cell.
- ii) It helps in entry of distribution of food materials in a cell.
- iii) It helps in gaseous exchange in intercellular spaces of leaves.