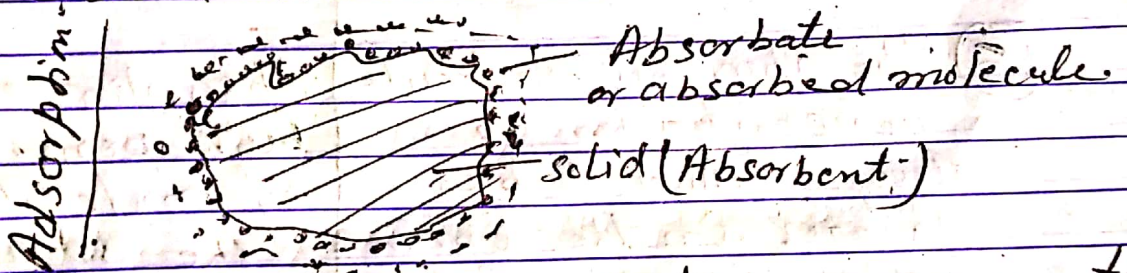


B.Sc. III. PAPER-5

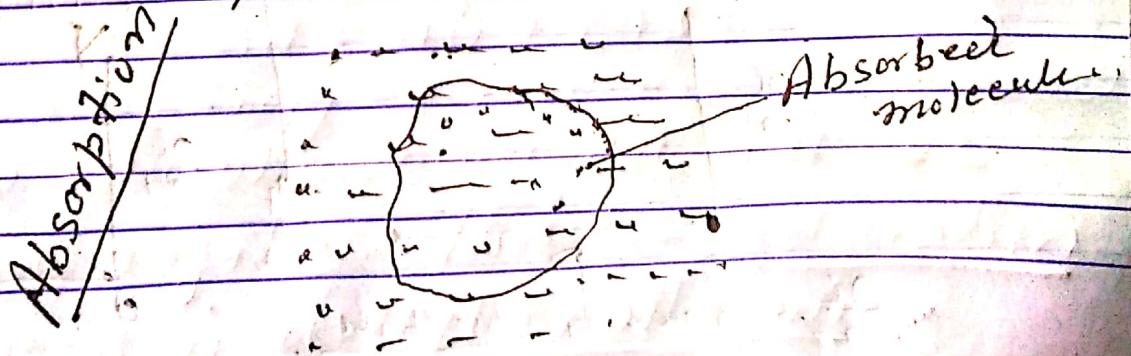
Adsorption :- The process of attracting and retaining the molecules of a substance on the surface of solid or liquid is called adsorption. Adsorption is a technical term which denotes the taking up of gas, vapour, liquid by a surface or interface.

The substance which is adsorbed on the surface is called adsorbate and on which adsorption is happening is called adsorbent.



Adsorption occurs on the surface of adsorbent but absorption occurs in bulk of liquid or solid. This is the basic difference between adsorption

and absorption



Difference between adsorption and absorption.

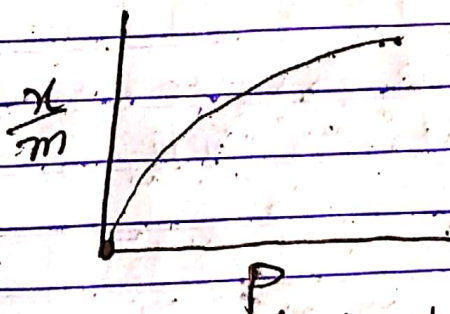
Adsorption

(1) It is surface phenomenon. It occurs on the surface of the substance.

2. Equilibrium in adsorption is attained very quickly i.e. in short time.

(3) The adsorbed molecule concentration is always found to be greater in the immediate vicinity of surface than in the free phase (Adsorbate).

(4) Typical adsorption isotherm is given below



$$\frac{x}{m} = \frac{\text{mass of adsorbate}}{\text{mass of adsorbent}}$$

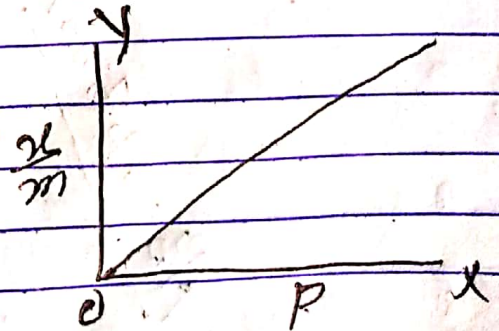
Absorption

(1) It is bulk phenomenon. It occurs in whole body of the substance to form solution or compound.

Equilibrium in absorption occurs in long time.

Absorption involves bulk penetration of molecules in the structure of solid or liquid.

(4) Typical absorption isotherm is given below



Adsorption
Examples

(i) NH_3 gas is adsorbed
by charcoal

(ii) water vapour is
adsorbed by silica
gel

absorption.

(i) NH_3 is absorbed
by water to form
Ammonium hydroxide

(ii) water vapour is
absorbed by anhydrous
Calcium chloride.

characteristics of adsorption:-

- (i) It is a spontaneous process.
(ii) It is accompanied by decrease
in free energy changes i.e. ΔG
and when ΔG becomes zero equi-
librium is attained.

(iii) From eqn of Gibbs Helmholtz
 $\Delta G = \Delta H - T\Delta S$
 $\Delta H = \Delta G + T\Delta S$

As the entropy and free energy decrease
in adsorption, hence ΔH will be
also negative. Therefore adsorption
process is always exothermic.