COLIDEL STATE

Def - A surface is said to be in a Colidel state if the size of the solid particle lie b/w 10 Å → 1000 Å -

Comparision between true solution suspention and Colidel solution & Colidel -

Property	True solution	Colidel	suspertion
① Partical size	smaller then 10Å	10 → 1000 Å	greater than 1000Å
2) visibity	solued partical cannot be observe by our normal eye or even under microscope	use ultra micro scope.	Easly seen by our normal eye -
3) seperation	True solution neither seperate by filter paper any mentance	it cannot be seperated by filter paper but it can easily seprate by membrane	it is easily seprate by filter paper as well as membrane -
4) Setting	solude particle can not be settled down	solude partide Pertially setted down.	solude particle Com-plelly settled down -
5) Nature	True is a gomozenous mixtare.	it is a hetrozenous mix -	it is a Hetrozenaus mix -

6- Appearance — Clear Solution almost clear opaque.

{ Component of Colidel Solution / (Phases of colidel solution } → There are 2 component of colidel solution.

1) Dispersed phase

2) Dispersion Medium -

* Dispersed phase →
it is the component present in small Quanity.

Dispersion Medium →
it is the component which is in large amount and dispersed phase add into it -

* Classification of Colidel Solution →

1) Classification on the basis of interaction between the dispere phase or disperse medium.

2) Classification on the basis of Physical state of the Component.

3- Classification on the basis of charge.

(1) Classification on the basis of interaction b/w the desperse phase or dispestion Medium -
on the basis of intermedium b/w disperse phase and dispersetion mridium these are 2 Types of Calidel Solution.

1) lyophilic Colidel Solution
2) lyophobic " "

* Lyphilic ⇒ Such Type of colidel solution in which the great affinity exist b/w disperse phase and dispersion Midium.

ex- (starch, gluttien

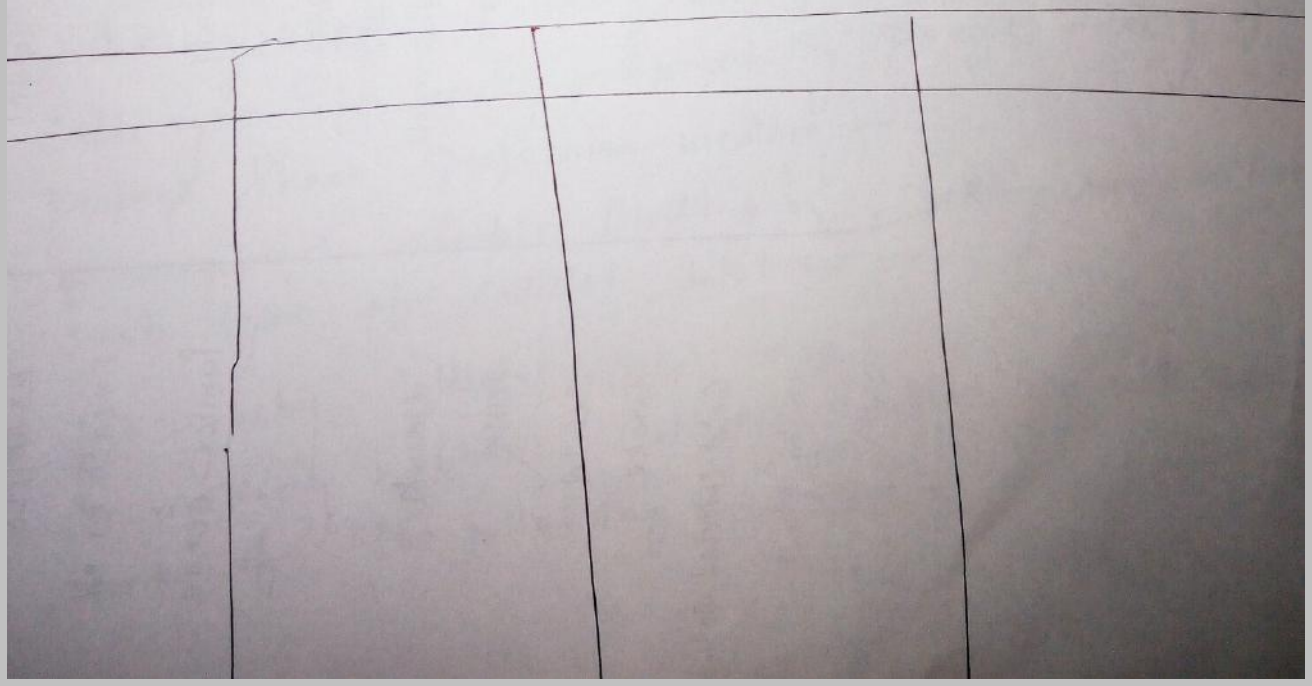
if water is dispersion medium in this case, it will known as hydrophlic.

* Lyophobic ⇒ Such Type of colidel solution in which the less affnity exist b/w disperse phase and dispersion Medium -

Ex- Metal colidel solution.

If water is dispersion medium in this case it will be known as Hydrophobic -

Classification on the Basis of physical state ⇒



Disperse Phase	Dispersion Medium	Name of Colidel	Example
1- gas	liquid	foam	Froath in oil
2- gas	solid	solid foam	Pumice stone
3- gas	gas	——	——
4- liquid	gas	No colidel solution form	Claude
5- liquid	liquid	liquid aerosole implesion	Milk
6- liquid	solid	Jel	Pearl
7 solid	gas	Aerosole	Smoke
8 solid	liquid	Sol	Gold Colli
9- solid	solid	Solid sol	Ruby gl

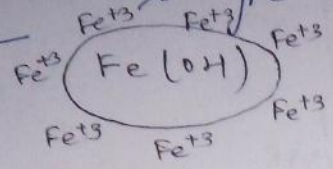
OUT THE BASIS CHARGE

There are two types of colidel solution —

1- Positive charge colidel solution —

IN This type of colidel solution +ve charge apresent-

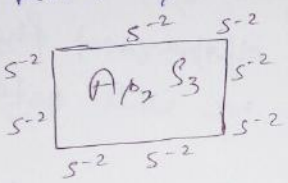
Ex —



⇒ -ve lly charge colidel solution ⇒

Such type of colidel solution in which -vélly charge in present know go -velly charge colidel solution.

Ex —



* Method of Prepration of Colidel solution ⇒

⇒ FOR Lyphilic Colidel solution ⇒

There are no any special types of method for making hyphilic colidel solution.

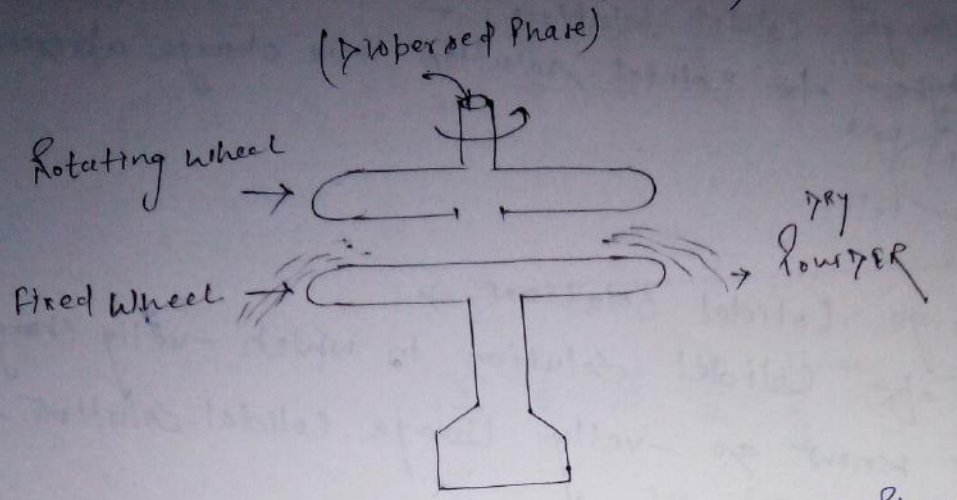
Such type of easily prepraed By direct mixing of Dipers phase Dispersion medium —

if requred simple Boiling of Shaking we can form such type of Colidel solution.

* for hypobic Collidel solution ⇒

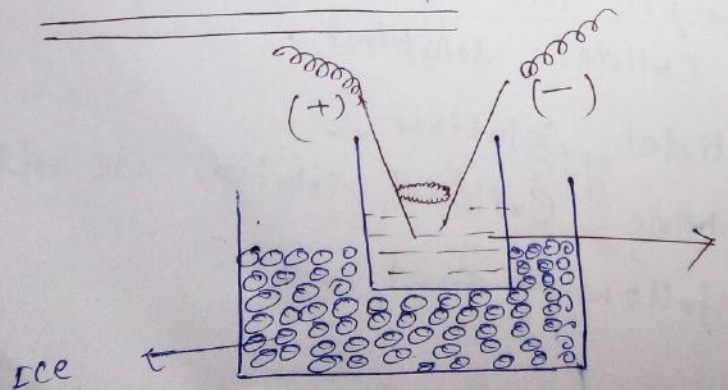
for making hyphobic Collidel solution we will use some of the following method —

* Mechenical Dispersion Method ⇒ COLLIDEL Mill ⇒

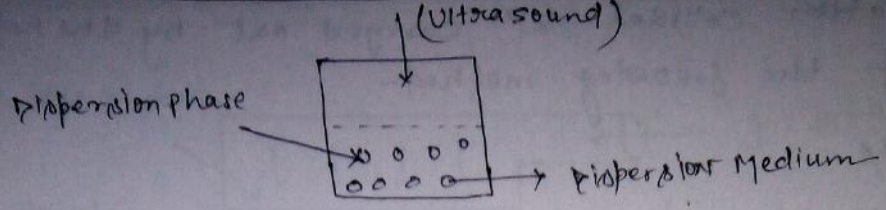


In this method will add dispersed phase in the Rotating wheel By which we will octand Powder of Disperse phase.
This Powder after introduced into the dispersion medium we will add the stablizer, formation of Collidal Solution take place.
Ex- formation of ink occure By this method—

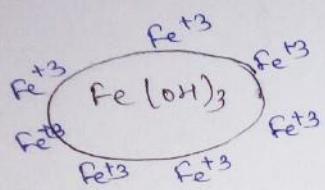
IIⁿᵍ BREDIG'S ARC METHOD :-

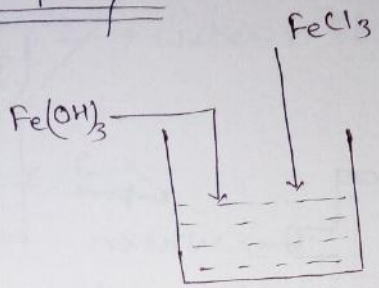


ALTRASONIC DISPERSSION METHOD ⇒

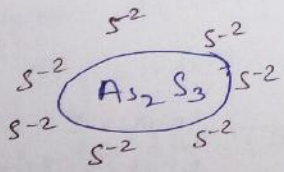


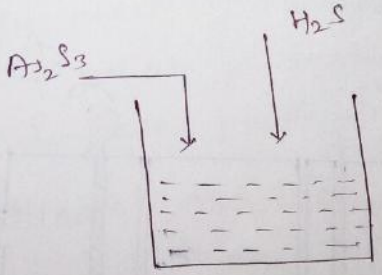
V.I th most imp- PEPTIZATION METHOD ⇒





The formation of Colloidal solution of a compound by the help of an electrolite in which one ion is common which that compound known as peptization method — and that electrolite is known as peptizing agent.





$FeCl_3 \longrightarrow Fe^{+3} + 3Cl^-$

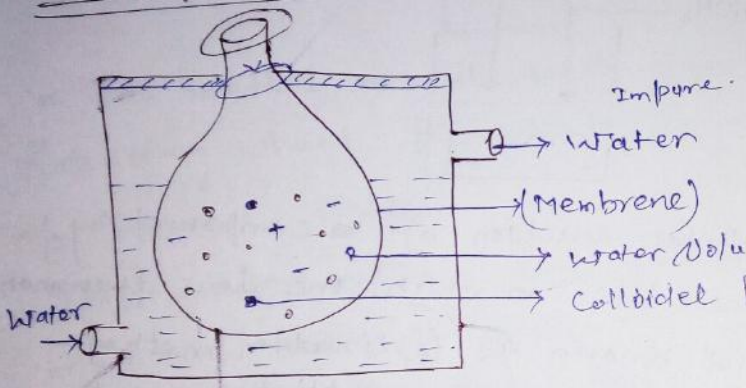
$Fe(OH)_3 + Fe^{+3} \rightarrow Fe(OH)_3^{Fe^{+3}}$

* Purification of Collidel Solution ⇒

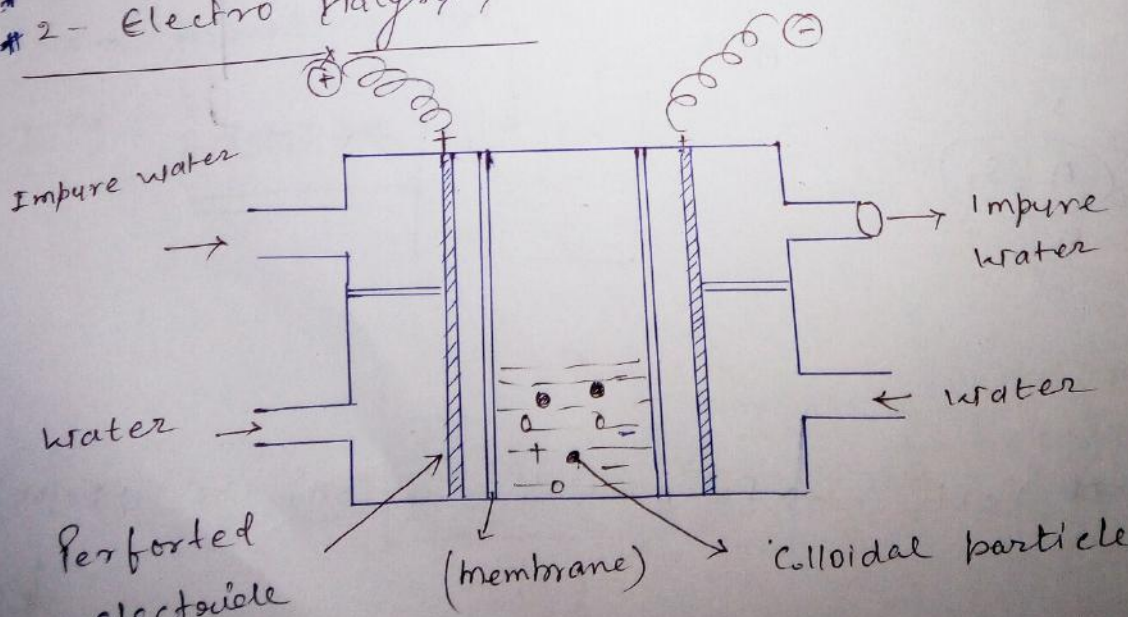
The purification Collidel soln carryed out by the help of one of the following method-

1- Dialysis
2- ELECTRO DIALYSIS.
3- Altra filtration

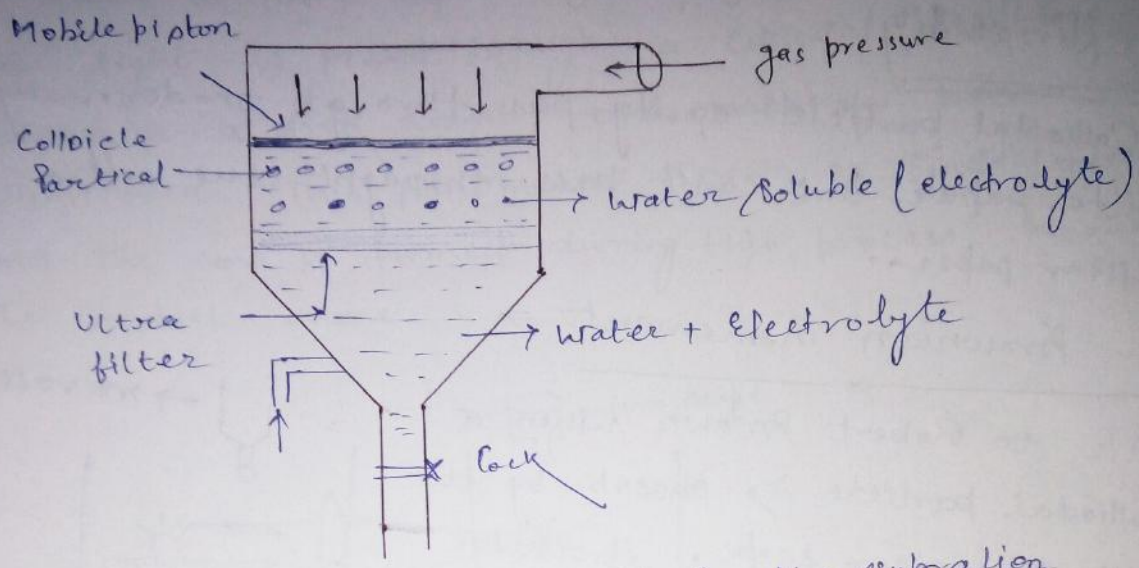
1- Dialysis ⇒ (dialyser)



* 2- Electro Dialysis ⇒



3- Ultra filtration METHOD ⇒



This method is more usefull for the ~~suporation~~ purephication of such type of colliodel Solution in which water Soluble electrolyte in present. in this system pressure is exerted in mobile crystan due to which only electrolytic particle transfer from ultra filter. which is recive by water. By which the impure purefyl colliodel particle.

* Property of the colliodel Solution.

1- Colliodel Soln is a hytrogeneous mixture

2- the colliodel particle of Colliodal Soln Can't be the Observed by the Simple micro Scope.

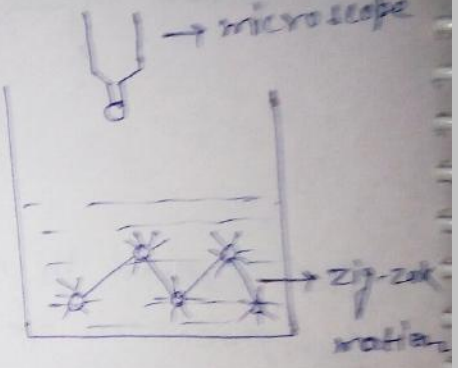
for observing the colliodal particle will use a type of micro scope known as ultra micro scope Dipcorbed By zsig mondoy -

3- flitrability

Colliodal particle easily pass through ordernary filter papare but can't pass throught the ultra filter paper..

4- Brownian momement ⇒

A/c to Robert Brown when a colliodal particte is observb by the help of micro scope, it receive the energy from the light of micro scope and aquare kinetic energy. and move, but due to colliodion with other colliodal particle its path is zig-zak - there for this motion of the colliodal particle is known as Brownian monoement..

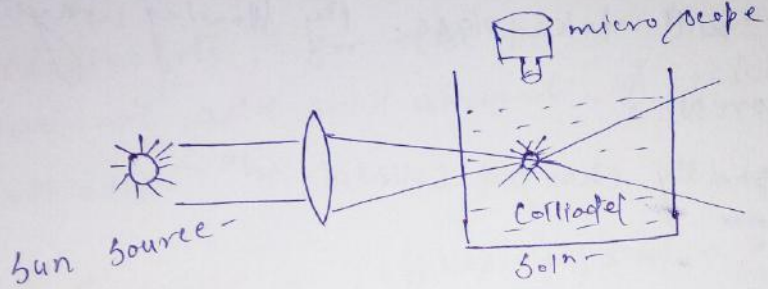


greater the viscosity of the colliodal solution greater will be the posibility of Brownian moment.

Optical property ⇒

i- Tinddel effect ⇒

Tinddel in 1869 obserbed that if a strong beam of light is passed through a colliodal solution placed in a drak room, the path of beam gate elluminated This phinomenone known as Tinddel effect. and the cone is formed during this process known as Pinddel Cone.



Charged on colliodal partical ⇒

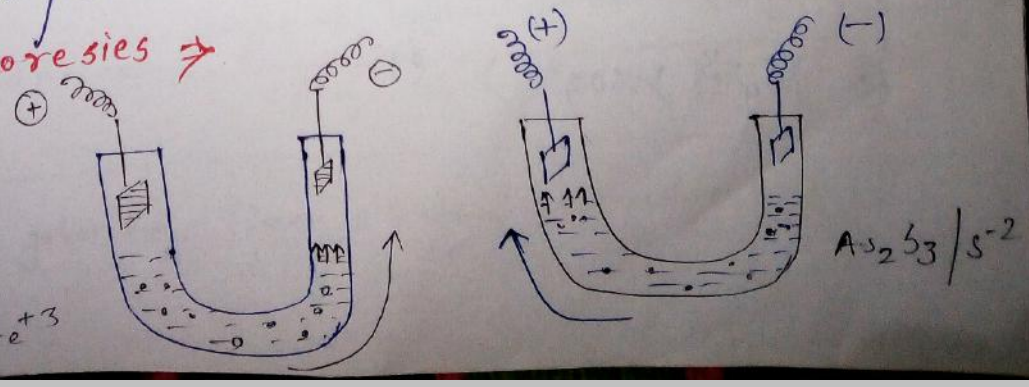
There are two types of colliodal soln in occure in nature.

1- +velly charged Colliodal Soln

2- -velly charged Colliodal Soln -

1- positivibily -

Electrophoresies ⇒



greater the coagulating power smaller will the coagulation value-

protective action sol ⇒
The property of lyphilic colliodal soln to prevent the (coagulation) presipitation of a lyphobic colliodal soln is called protective action of sol - and this colliodal is known as protective colliodal.

Ex- For making ice-cream will use NaCl as an electrolyte, for the prevention of coagulation we will add small amount of geletene as a protective colliode.

(lyphobic-) mign ↑ = gold number

Gold NUMBER ⇒ (lyphobic) [10ml to 10% NaCl + 90% H_2O

The protetive power of lyphilic colliodal soln is majorely in gold number.

The number of miligram of lyphilic colliodal soln that will just prevent the coagulation of 10 ml of gold sol on addition of 1 ml of 10% NaCl, known as gold number.

$$\text{gold no.} = \frac{\text{weight of lyphilic colliodal soln} \times 10}{\text{volume of gold sol (ml)}}$$

higher the gold no. lower will the protective power.

emulsion :- It is a liqued - liqued colloidal sol^{n}. In which dispresed phase in liqued state and dispresion medium also in liqued state.

Ex- milk.

There are two types of emulsion -

1- oil in water types emulsion (O/W)

2-

in this type of emulsion disperse phase is oil and Dispersion medium is water. It is repretated (O/W).

2- Water in Oil type emulsion ⇒ (W/O)

In this type of emulsion disperse phase is in water and Disporesion medium is oil state. it is supprented By (W/O).

Test for emulsion ⇒

(1) Conductivity test ⇒ electrical conductivity of oil in water type emulsion has greater value as compaire to water in oil type emulsion.

2) Dilusion Test ⇒ Oil in water type emulsion can easily dilute with water on the other hand water in oil type emulsion can't be with dilute with water.

Viscocity Test ⇒ water in oil type EMULSION HAVE GREATER VISCOCITY as compair to OIL IN WATER.

PREPRATION OF EMULSION ⇒ For making emulsion we will use Three types of component.

1- Dispres phase
2- Dispresion medium
3. emulsifying agent.

add dispres phase and Dispresion medium. shacking this mixuture and add small amount of emulsifying agent.

Ex- Shop, Sinthetic Ditergent are the best example of emulsion.

Demulsification ⇒

The spration of the component of the emulsion is knows as Demulsification.

The process of Demulsification take place by the help of following methoel-

1- Bioling
2- Freezing
3. Centrifigation method
4- By adding salt.
5- By adding acid and Base-

Gels⇒ It is a liqued solid type emulsion in which dispres phase in liqued state and dispresion is in solid state. The formation of Gel is known as gelasion.

*** Types of gel⇒**

There are Two types of Gel→
ON The Basis of Interparticle force of attraction there are two type of gel-

1- elastic Gel-
2- Non- elastic gel -

1- elastic gel - elastic gels are those which possess the property of elastysity. They change there shape on apllying force an return to its original position when the force is removed.
Ex gelatene, Starch,

2- Non - elastic gel ⇒ These are those gel which are rigide they are prepaired by chamical rxn. In it covelent Bond formation occure.
Ex silica gel-

Properties of Gel ⇒

1- Hydration and Dehydration property ⇒
Gels have a tendency to remove or absorbe water

*SWELLING ⇒ फूलना

When water is absorb by the gel, it increase its volume an process is known as swelling.

*SYNERESIS ⇒ (सिकुड़ना)

When water is removed from the gel it under go srinking and the process is known as syneresis—

Application of Colliodes

Colliodes play an important role in our deially life and industry. a fue of the important application of Colliodes are listed flue.

1- food
2- medision.
3- Formation of delta.
4- Artificial kidney meehene
5- Blue colour of sky
6- Clearification of impure water.
7- electrical presipitation of smoke.

FOOD= many of our food are present in nature Colliodal in nature.

Ex- milk. frut Gellies etc.

2- medicen ⇒ Colliodal medicenes beeng finally divideel, are more effective and are easily absorbed in our system.

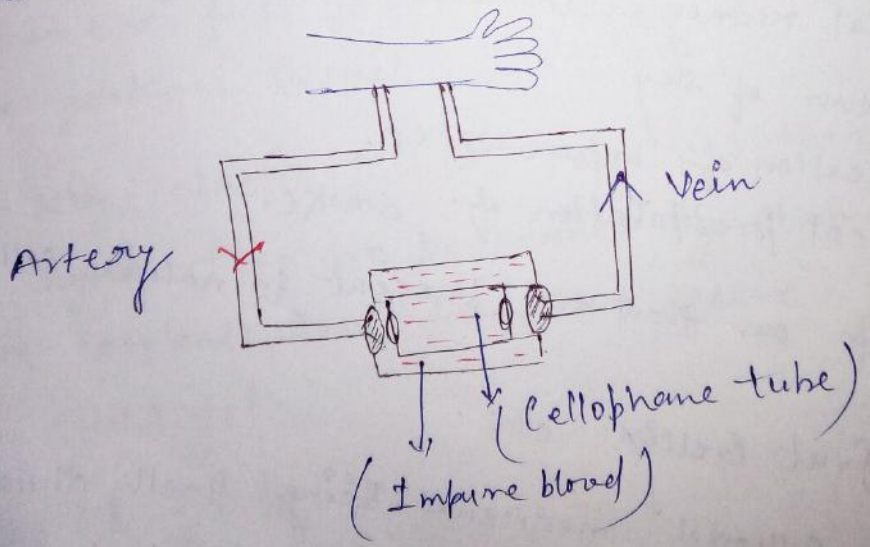
Ex- Code liver oil. Cup serop. tonik's, ointment (मलम) injection

3- FORMATION OF DELTA ⇒

The river water, ocean water contain colloidal particle like sand, clay, cation and anion all these particles agregate and form a large precipitate area know as delta.

4- Artificial Kidney machine ⇒

The human kinedny purefy the blood by dyleses through natural membrane. the top seak west products such as urea uric acid pass through membrane while colliodal size particle. (thumoglobin) are retained. know a day the patient blood can be purefy by artificially kindeny machine. in which cellophane tube is crounded around a impure blood act as a membrane.



Blue colour of sky ⇒

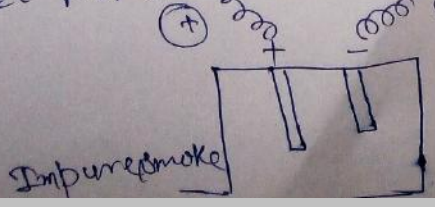
In the atm there are large number of dust particle, no. of gaseous particle. there for whole atm act as a colliodal system.
due to axistents of colliodal system atm act satisfy the phenomina of Tyndal effect. when the sun ray enter the atm these stryk the colliodal particle. the particle absorb sun light and scatter Blue colour light.
There for atm apaire Blue.

* Clearification of impure water ⇒ As (is a slow poision)

Due to present of colliodal particle in water which is not sutable for human body are also removed by the process of coagulation.
for this purpose we will we different type of coagulating agent--
Ex - Alum-

* Electrical precipitation of smoke

The dust particle present in smoke consider as a colliodal particle which are sbratated by a proces of electrophoresis.
in this process impure smoke collect in a cantain er, where the electrode are present. the charge colliodel particle absorbed by these electron.



Example 1- The rate law for the decomposition of N_2O_5 (l) is. rate $= K[N_2O_5]$ where $K = 6.22 \times 10^{-4}$ sec^{-1}. Calculate half-life of N_2O_5 (l) and the number of seconds it will take for an initial concentration of N_2O_5 (l) of 0.100 M to drop to 0.0100 M.

Soln (A) Calculate the half-life-

$$t_{1/2} = \frac{0.693}{K} = \frac{0.693}{6.22 \times 10^{-4}\ sec^{-1}} = 0.111 \times 10^{4}$$

$$= 1.11 \times 10^{3}\ sec$$

(B) Calculation of time in second for drop of $[N_2O_5]$ from 0.100 M to 0.0100 M.

$$K = \frac{2.303}{t} \log \frac{[N_2O_5]_0}{[N_2O_5]_t}$$

$$t = \frac{2.303}{K} \log \frac{[N_2O_5]_0}{[N_2O_5]_t}$$

Substituting values-

$$t = \frac{2.303}{6.22 \times 10^{-4}} \log \frac{[0.100]}{[0.0100]}$$

$$= \frac{2.303}{6.22 \times 10^{-4}} \times 1$$

$$= 0.370 \times 10^{4}$$

$$\boxed{t = 3.70 \times 10^{3}\ sec}$$