Dt. _____

Pg. _____

- Physical Pharmaceutics 3rd SEM

① Define Solvation and Association?

Solvation is a process of Interaction of Solute molecules with Solvent molecules which leads to Stabilization of Solute species in the Solution. and the word Association is defined as a Chemical reaction in which opposite electric Charge ions comes together in Solution & form a distrinct Chemical entity.

② Explain Raoult's Law?

Raoult's Law States that the partial vapour pressure of a Component in a Solution is directly proportional to the mole fraction of that Component in the Solution.

$$P \propto X \text{ or } P = P_0 X$$

③ Define Diffussion?

Diffusion is Simply defined as a physical process that refers to net movement of molecules from a region of High Concentration to lower Concent under the influence of Concentration gradient.

Passive and Facilitated diffussion are the mainly types of diffusion.

④ State equation for Ideal Solubility parameters?

Ideal Solubility parameters is a numerical value that Indicates relative Solvency behaviour of Specific Solvent.

$$\delta = \left(\frac{\Delta H_v - RT}{V} \right)^{1/2}$$

Here,

δ = Hildebrand Solubility parameter

Dt. _____

Pg. _____

- ΔH_v = Heat of vaporization
- R = Universal Gas Constant
- T = Absolute Temprature
- V = Molar volume

Hansen Solubility parameter

$$\delta = \sqrt{\delta_d^2 + \delta_p^2 + \delta_h^2}$$

- $\delta^2 d$ = dispersion Component
- $\delta^2 p$ = Polar Component
- $\delta^2 h$ = H- bonding Component
- δ = Hansen Solubility parameter

⑤ Define Term freely Soluble ?

Freely Soluble materials are those, which have high Solubility. Usually materials are treated as freely Soluble if 1g of material requires 1 to 10 ml of Solute to dissolve.

⑥ Define Molarity & Normality ?

- **MOLARITY**

It is defined as no. of moles of Solute dissolved per litre of the Solution It is denoted by 'M'

$$M = \frac{\text{No. of moles of Solute}}{\text{Volume of Solution (in lit)}}$$

- **Normality**

It is defined as no. of gram equivalent of Solute dissolved / present per litre of Solution. It is denoted by 'N'

Dt. _____

Pg. _____

$$N = \frac{\text{No. of Gram Equivalent}}{\text{Volume of Solution (in ltr)}}$$

⑦ Enlist limitation of Distribution Law?

There are some limitations of Distribution law.

- Distribution Law is applicable only for very dilute solutions.

Temprature must be Constant throughout the experiment.

Solute must be in same molecular state in both solvents.

Solvents must be Immiscible.

⑧ Define Real Solution?

A True solution is a homogenous mixture of two or more substances in which the particle size of the material dissolved in the solvent is less than 10^{-9} m or 1nm.

⑨ Define Solubility?

The maximum amount of solute that can be dissolved in a fixed volume of solvent at Constant Temprature is defined as the solubility.

⑩ Define saturated, Unsaturated, Super Saturated Solution?

- SATURATED SOLUTION

The Solution which Contains maximum amount of Solute that can be dissolved by the Solvent at a given temprature is known as Saturated Solution.

- UNSATURATED SOLUTION

A Solution which Contains less than maximum amount of Solute that

Dt. _____

Pg. _____

Capable of being dissolved at a given temprature is known as Unsaturated Solution.

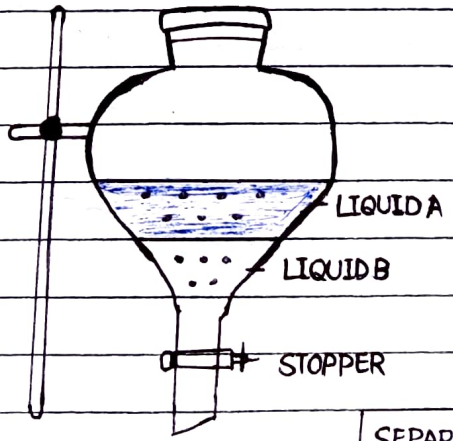
- **SUPERSATURATED SOLUTION**

A Solution which Contains more than maximum amount of Solute that is Capable of being dissolved at a given Temprature is known as Supersaturated Solution.

(11) Define Distribution Law?

- The Distribution Law was given by Sir Walther Hermann Nernst, a German Chemist, hence it is also known as Nernst Distribution law of partition Coefficient.
- According to Distribution law: If a Solute X distributes itself between two Immiscible Solvents A & B at Constant Temprature and same molecular Condition then

$$\frac{\text{Concentration of X in A}}{\text{Concentration of X in B}} = K_D$$



SEPARATING FUNNEL

Dt. _____

Pg. _____

UNIT-II

① Define Vapour pressure

Vapour pressure is defined as the pressure exerted by a vapour in Thermodynamics equillibrium with its Condensed phases (Solid or liquid) at a given temprature in a closed system.

② Define the Term Critical Solution Temprature

The Temprature at which two partially miscible liquids become Completely miscible at all proportions is called the Critical Solution Temprature.

③ Define Relative Humidity

The word Humidity Stands for Amount of water vapour present in Air. Now the relative Humidity is defined as amount of water vapour present in air divided by maximum amount of water vapours that the air Can hold at same Temprature.

$$\text{Relative Humidity} = \frac{\text{Amount of Vapour present in Air}}{\text{Max. Amount of Vapour that air Can hold}} \times 100$$

④ Define Eutectic Mixture?

When two or more Solid Component mixed with eachother and the melting point of the mixture get decreased Compare to the melting point of the Individual Components then this type of mixture is known as Eutectic mixture.

⑤ Define Sublimation

Dt. _____

Pg. _____

Sublimation is the process in which a solid is directly converted into gas without converting into liquid.

⑥ Differentiate b/w amorphous and Crystalline solids?

Crystalline	Amorphous
Regular arrangements of particles	Irregular arrangements of particles
Long order arrangements	Short order arrangements
Called True solids	Called pseudo solid
They have sharp melting point	They have long range of melting points.
Eg: Salt, Iron, Gold	Eg: Glass, Rubber, Wax.

⑦ What is liquid Crystals

Liquid Crystals is a state of matter which has properties similar to Crystalline solids as well as liquids.

⑧ Define Glass State

Glassy State also termed as SuperCooled liquids

They are amorphous in nature

Glassy state are Generally formed by melting Crystalline solids at very high Temprature & then by Cooling it rapidly.

⑨ Define latent heat

Latent heat is defined as heat or Energy that is absorbed or release during the phase Change of the Substance It can be either from a solid to liquid, liquid to Gas or vice-versa.

Dt. _____

Pg. _____

(10) Define Liquid Complexes

Liquid Complexes are basically the Gases or Liquids that contains particles of other Substances dispersed within them.

These are binary mixtures that have Co-existance between 2 phases.

(11) Define Polymorphism

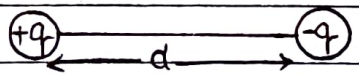
When a Substance exist in more than 1 Crystalline form & each form has different physical properties, then these types of Substance are known as Polymorphs, and the ability of Phenomenon of Substances to exist in more than 1 Crystalline form is known as polymorphism.

(12) Define Dipole Moment

The Dipole Moment is defined as product of Magnitude of Charge and distance between the Charges in a polar Compound.

It measures net polarity of molecules.

It's denoted by 'μ'



$$\mu = q \times d$$

Dt. _____

Pg. _____

UNIT-3

① Define the Term Detergency

Detergency refers to the removal of unwanted foreign material from a surface in a liquid bath containing a detergent formulation.

② What are Surface & Interfacial Tension

Surface is the Term used to define either a Gas-Solid or Gas-Liquid Interface, Surface Tension is defined as tensile force acting at the surface of the liquid.

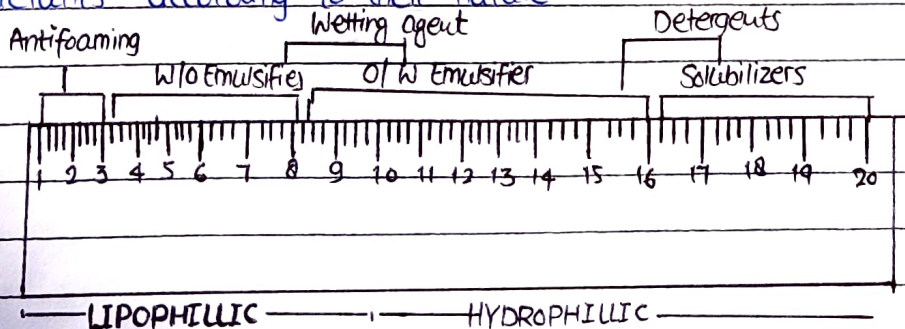
Interfacial Tension is defined as force per unit length existing at the Interface between two Immiscible liquids.

It's unit is N/m.

③ Define HLB Scale

HLB Stands for Hydrophillic - Lipophillic balance.

HLB Scale System Consist of an Scale that is designated to differentiate Surfactants according to their nature.



Dt. _____

Pg. _____

④ Classify Surfactants

There are four types for Surfectants

① Anionic Surfactants

② Cationic Surfactants

③ Ampholytic Surfactants

④ Non - Ionic Surfactants.

⑤ Define Critical Micelle Concentration

The CMC is defined as the maximum Concentration of a Surfactants at which micelles do not form or the Concentration at which micelle begins to form.

⑥ Define Surface free energy

Surface free energy is the work that would be necessary to increase the Surface area of a Solid phase. Surface free energy has a decisive influence on the wettability of Solids by liquids.

⑦ Define the Term Spreading Co-efficient

Spreading Co-efficient is the measure of Tendancy of Spreading, Spreading Co-efficient is defined as difference between Work of adhesion and Work of Cohession.

$$S = Wa - Wc$$

⑧ Define the Term Adsorption

Adsorption is a surface process that leads to transfer of a molecule from a bulk to Solid Surface. This can be occur because of Physical

Dt. _____

Pg. _____

forces or by Chemical bonds.

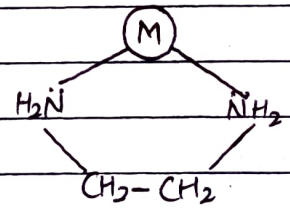
⑩ Define Solubilization

The process of Solubilization involves the breaking of inter-ionic or Inter molecular bonds in the Solute, the separation of the molecules of the molecules of the Solvent to provide space in the Solvent for the Solute Interaction between the Solvent and the Solute molecules or Ion.

UNIT-4

① Define Chelate Compounds

Chelates are the Complexes in which ligand provides two or more Donar atoms Ligands are generally Bidentate or multidentate i.e. EDTA, Ethylenediamene Complexes are mostly Cyclic Structure/ Closed ring.



② Define the Term Plasma protein binding

Plasma protein binding defines the degree ~~the~~ of binding of a drug to Plasma proteins.

eg. Albumin, Lipoprotein, Globulin

③ Define Ligands

Dt. _____

Pg. _____

The Ligand is a molecules that Interacts with another molecules, the Substrate, to form a Complex.

- **UNIT-5**

① Define Sorenson's pH Scale

pH is defined as the negative logrithm of Hydrogen Ion Concentration. The range goes from 0-14, within 7 being neautral, pH less than 7 indicates Acidity, Whereas pH greater than 7 indicates Base.

② Differentiate between Isotonic, Hypertonic, Hypotonic

- Isotonic Solution

A buffer solution whose Concentration/osmotic pressure is equal to the 0.9% W/v of Nacl, is known as 'Buffer Isotonic Solution'

- Hypotonic Solution

A Buffer Solution whose Concentration/osmotic pressure is less than 0.9% W/v of Nacl, is known as Hypotonic Solution.

- Hypertonic Solution

A Buffer Solution whose Concentration/osmotic pressure is greater than 0.9% W/v of Nacl is known as Hypertonic Solution.

③ Write Buffer equation

Buffer equation also known as Handerson-Hasselbatch equation used to Calculate the pH of a buffer Solution.

Dt. _____

Pg. _____

$$pH = pka + \log \frac{[Salt]}{[Acid]}$$

⑤ Write the application of buffers

- Buffers are used in Industrial processes such as paper, dyes, Inks, Paints, drugs etc.

Buffer are also employeed in Agriculture, dairy products, preservation of various types of fruits & foods.