

Time: 3 Hours

Marks: 75

Q. 1 Attempt all multiple-choice questions (MCQ)

20MARKS

- 1 Which of the following is inversely proportional to solubility of drugs?
a Dielectric Constant
b Dipole moment
c Ratio of polar to nonpolar groups
 d Ratio of nonpolar to polar groups
- 2 Which of the following is a limitation of distribution law?
a Applicable to concentrated solutions only
b Remains unaffected by changes in temperature
c Applicable only if solute undergoes neither association nor dissociation
d Applicable only if solute reacts with solvent
- 3 Driving force for passive diffusion is _____
a Temperature
 b Concentration gradient
c Pressure
d Electric potential
- 4 Which of the following system shows both lower consolute temperature and upper consolute temperature?
a Phenol-water system
b Octanol-water system
 c Nicotine- water system
d Triethylamine- water system
- 5 According to Noyes-Whitney's equation, the factor that is inversely proportional to dissolution is _____
a Surface area
b Intrinsic solubility
 c Thickness of diffusion layer
d Diffusion coefficient of drug
- 6 Which of the following analytical techniques is used for identifying Polymorphs?
 a X Ray Diffraction
b UV Visible spectroscopy
c Polarimetry
d Refractometry
- 7 For a given molecule, the following _____ is an essential prerequisite for showing optical activity
a Symmetrical geometry
b Linear shape
 c Presence of chiral carbon
d Planar shape

8. Which of the following with regards to crystalline form is correct?
~~a~~ Exhibits anisotropy
 b Exhibits higher solubility than amorphous forms
 c Exhibits isotropy
 d Exhibits lower intermolecular forces
9. When a matter changes from solid state to gaseous state this process is known as _____
 a Condensation
~~b~~ Sublimation
 c Evaporation
 d Deposition
10. When a solid solute, a solid solvent, and a liquid mixture exists in the same phase, this point is termed as _____
~~a~~ Eutectic point
 b Critical point
 c Melting point
 d Boiling point
11. The spreading coefficient value _____ indicates that the spreadability between two liquids is good, homogeneous and uniform.
 a -86
 b -35
 c -1.5
 d 64
12. The unit of surface tension is given as _____ in C.G.S system
 a Newton/meter
~~b~~ Dynes/cm
 c Newton
 d Newton/cm
13. The process in which the adsorbate gets adsorbed on the adsorbent is termed as _____
~~a~~ Adsorption
 b Absorption
 c Resorption
 d Evaporation
14. Higher the HLB value, _____ is the nature of a given surfactant
~~a~~ Lipophilic
 b Amphiphilic
~~c~~ Hydrophilic
 d Lyophobic

- 15 Identify the type of complex classified under Channel lattice complexes
- a PABA-Caffeine complex
 - ~~b~~ Starch- iodine complex
 - c Hexamine Cobalt Chloride complex
 - d Water-Isopropyl alcohol complex

- 16 One of the following parameters is essential for the analysis of complexes
- ~~a~~ Stoichiometric ratio of donor to acceptor
 - b Concentration of metal ion uncomplexed
 - c Concentration of ligand uncomplexed
 - d Number of moles of ligand complexed

- 17 Carbowaxes and Pluronic are examples of _____ Complex
- a Channel lattice
 - b Quinhydrone
 - ~~c~~ Polymer
 - d Aromatic

- 18 In which of the following methods water is used for adjustment of tonicity.
- ~~a~~ Haemolytic method
 - ~~b~~ Sodium Chloride equivalent Method
 - ~~c~~ White Vincent Method
 - d Cryoscopic Method

- 19 Shrinkage of Blood cells is observed in _____ solutions
- a Hypotonic
 - ~~b~~ Hypertonic
 - c Isotonic
 - d Neutral

- 20 pH of pharmaceutical buffer can be calculated by
- a BET equation
 - b Michaelis Menten equation
 - c Noyes Whitney equation
 - ~~d~~ Henderson Hasselbalch equation

Q 2. Attempt ANY TWO question

(10 MARKS EACH)

- Q.i.a Discuss key factors affecting solubility of drugs in liquids.
- Q.i.b State Raoult's Law and explain positive deviation from Raoult's law.
Calculate the vapour pressure lowering caused by the addition of 100 g of sucrose (mol mass = 342) to 1200 g of water if the vapour pressure of pure water at 25°C is 23.8 mm Hg

- Q.ii.a Write a note on Polymorphism and its applications.
- Q.ii.b Explain design, construction and working principle of Abbe's Refractometer.

- Q.iii. a. Explain the concept of surface tension. Discuss the various factors affecting the surface tension of a given liquid.
- Q.iii. b. Explain the concept of HLB.
If equal volumes of liquid A and water are measured as 90 and 30 drops, respectively, and the densities of A and water are 0.896 and 0.964 g/cm³ respectively, calculate the surface tension of liquid A. (Surface Tension of water = 72.8 dynes/cm)

Q 3. Attempt ANY SEVEN questions**(5 MARKS EACH)**

- Q.i. Explain the mechanism of solute solvent interactions.
- Q.ii. State partition law and elaborate on applications of partition coefficient.
- Q.iii. What are liquid crystals? Give its significance.
- Q.iv. What is the difference between adsorption and absorption? Distinguish between physisorption and chemisorption.
- Q.v. Enlist the methods of analysis of complexes and explain any one method in detail.
- Q.vi. Explain the concept of complexation and discuss its pharmaceutical applications.
- Q.vii. What is Drug-Protein binding? Discuss its significance.
- Q.viii. Explain cryoscopic method to adjust tonicity of a solution. How much sodium chloride is required to render 100 mL of 1% solution of apomorphine hydrochloride isotonic with blood serum? ΔT_f of blood is 0.52°C; ΔT_f of apomorphine is 0.08 °C; ΔT_f value of sodium chloride (1% solution) = 0.58 °C
- Q.ix. Derive Henderson Hasselbalch equation for acidic buffer system
Calculate the pH of 0.025 N sodium hydroxide solution.