S.Y.B.Pharmacy
Sem – III
24/12/2025

Time: 3 Hours **Marks: 75**

Q. 1 Attempt all multiple-choice questions (MCQ) **20M**

1 If 1 part of a drug dissolves in 90 parts of water, which of the following solubility expressions will be assigned?

a Freely Soluble
b Soluble
c Slightly soluble
d Sparingly Soluble

2 Driving force for passive diffusion is _____.

a Electric Potential
b Osmotic Pressure
c Concentration Gradient
d Temperature

3 In a laboratory, a solid organic compound shows poor solubility in water but good solubility in ethanol. To prepare an aqueous solution, which technique should be considered

a Using water at room temperature
b Co-solvent technique
c Decreasing surface area
d Adding a non-polar solvent

4 Addition of NaCl to water generally

a Increases solubility of gases
b Decreases solubility of gases
c Maintains solubility
d Forms new gases

5 Lower critical solution temperature (LCST) means:

a Liquids are immiscible below this temperature
b Liquids are miscible below this temperature
c Liquids become gases
d Solids dissolve only at low temperature

6 Which transition involves conversion of liquid to vapor at temperatures below the boiling point?

a Sublimation
b Evaporation
c Freezing
d Condensation

7 Abbe's refractometer is used to measure which of the following property.
a Dielectric constant
b Optical rotation
c Refractive index
d Dipole Moment

8 A phase that lies between liquid and crystalline state is known as--------
a Sublime phase
b Mesophase
c External phase
d Solid phase

9 Energy absorbed or released by a substance during a change in its physical state without changing its temperature is called as-----
a Kinetic energy
b Potential energy
c Latent heat
d Entropy

10 Which form of the drug shows higher solubility in water?
a Amorphous
b Crystalline
c Liquid complex
d Stable form

11 The Du-Nouy ring detachment method is used to determine
a Dielectric Constant
b Interfacial tension
c Viscosity
d Surface energy

12 Which of the following substances decrease surface tension of water?
a Sodium Lauryl Sulphate
b Urea
c Sodium Chloride
d Sucrose

13 Wetting occurs when:
a Adhesive force = surface tension
b Adhesive force > Cohesive force
c Adhesive force < Cohesive force
d Adhesive force = Cohesive force

14 HLB range for Antifoaming agent is
a 1-3
b 7-9
c 8-16
d 13-16

15 Starch-iodine solution is an example of ----------complex
a Quinhydrone
b Picric acid complex
c Channel lattice type
d Aromatic

16 Which method is used to analyse cupric-glycine complex?
a Solubility method
b Distribution method
c Continuous method of variation
d pH titration method

17 Exterior of Beta Cyclodextrin is hydrophilic due to_____
a Hydroxyl group
b Sulphate group
c Pyrrolidine group
d Ammonium group

18 When a red blood cell is placed in a hypertonic solution, it will:
a Swell
b Burst
c Shrink
d Stay the same

19 Buffers exhibit maximum buffer capacity when
a pH = pKa
b pH = 0
c pH = 14
d Concentration is very low

20 Calculate the pH of a 0.01 M HCl solution.
a 2
b 3
c 4
d 1

Q 2. Attempt ANY TWO questions (10 MARKS EACH)

Q.i .a Explain mechanism of solute- solvent interaction in polar, nonpolar, and semi-polar solvents. **5M**

Q.i. b Calculate the vapour pressure lowering caused by the addition of 100 g of sucrose (mol mass = 342) to 1000 g of water if the vapour pressure of pure water at 25°C is 23.8 mm Hg. **5M**

Q.ii.a Explain factors affecting surface tension.
If equal volumes of liquid A and water are measured as 50 and 20 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) **5M**

Q.ii.b. Write a note on the HLB system and its applications. A polyhydric fatty acid ester has saponification number 80 and acid number 660. What will be the HLB value of the surfactant? **5M**

Q.iii. a Explain the concept of optical rotation and give its applications. **5M**

Q.iii. b Explain the principle and working of polarimeter with neat labelled diagram. **5M**

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

Q.i. Define Hildbrand solubility parameter and explain its significance in pharmaceuticals. **5M**

Q.ii Explain the concept of diffusion and state its significance in pharmaceuticals. **5M**

Q.iii Elaborate on Aerosols with its application in Pharmacy. **5M**

Q.iv What is the spreading coefficient? Derive an expression for spreading coefficient. What is its significance in pharmacy? **5M**

Q.v Enlist methods used for analysis of complexes and explain the solubility method in detail. **5M**

Q.vi Classify complexes and explain metal ion complexes in detail. **5M**

Q.vii Elaborate on concept of protein binding and give significance of protein binding in pharmaceuticals. **5M**

Q.viii Explain cryoscopic method to adjust tonicity of a solution. Calculate the amount of sodium chloride required for preparing 100 mL 1.5% Calcium Gluconate solution isotonic with blood serum? [Given: Sodium Chloride equivalent of Calcium Gluconate (E) is 0.16]. **5M**

Q.ix Explain potentiometric method used for pH determination and calculate the pH of buffer solution containing 0.25 M sodium acetate and 0.35 M acetic acid. The pKa of acetic acid is 4.76. **5M**
