(3 Hours) **[Total Marks: 75]**

N.B.: 1. All questions are compulsory
2. Draw diagram wherever necessary
3. Figure to the right indicate full marks
4. Use scientific calculators is permissible

Q.1. Multiple Choice Questions (MCQs) (Answer all the 20 questions) **20M**

1. ---------- involves interaction between solute and solvent molecules which leads to stabilization of solute species in the solution.
    a. Precipitation
    b. Crystallisation
    c. Solvation
    d. Lyophilization

2. From the point of view of dissolution, which of the following dosage forms exhibits the slowest dissolution rate.
    a. Coated tablets
    b. Solutions
    c. Suspensions
    d. Uncoated tablets

3. A real solution is that which
    a. Obeys Raoult's Law
    b. Does not obey Raoult’s Law
    c. Obeys Henry’s Law
    d. Does not obey Henry’s Law

4. For the study of distribution law, the two solvents should be:
    a. Miscible
    b. Immiscible
    c. Volatile
    d. Reacting with each other

5. Which of the following produces conjugate solutions:
    a. Partially miscible liquids
    b. Completely miscible liquids
    c. Practically miscible liquids
    d. Practically immiscible liquids

6. The rise of a liquid in a capillary tube does not depend upon_____
    a. Angle of contact
    b. Density of liquid
    c. Atmospheric pressure
    d. Radius of capillary tube

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

8. With increase in temperature the surface tension of most liquids _____
    a. Increases
    b. Decreases
    c. Remains same
    d. Becomes zero

9. The concentration of surfactant at which it begins to form micelles is called as:
    a. Critical point
    b. Krafft point
    c. Cloud point
    d. Critical micellar concentration

10. If the change from one polymorph to another is reversible, the system is called
    a. Monotropic
    b. Isotropic
    c. Enantiotropic
    d. Anisotropic

11. Under the ideal gas laws, which of the following is NOT a correct assumption
    a. Molecules occupy a negligible volume
    b. Gas volume are insensitive to changes in pressure
    c. No energy is lost when molecules collide
    d. Forces between molecules are insignificant

12. Optically active substance is able to show its optical activity due to_____
    a. Chiral Carbon in molecule
    b. Electronegativity in molecule
    c. Polarity of molecule
    d. Cohesivity of molecule

13. _____ has the fluidity of a liquid and optical properties of solid crystals.
    a. Liquid crystal
    b. Supercritical fluid
    c. Glassy state
    d. Crystalline state

14. For the proper functioning of aerosol, adequate vapor pressure is needed for this component
    a. Propellant
    b. Actuator
    c. Drug Solution
    d. Preservative

15. The correct order of extent of drug protein binding
    a. Albumin>glycoprotein > lipoprotein> globulin
    b. Glycoprotein >Albumin > lipoprotein> globulin
    c. Globulin>glycoprotein > lipoprotein> albumin
    d. Lipoprotein>glycoprotein > albumin> globulin

16. Which method is used to study copper glycine complexation?
    a. pH titration method
    b. Method of continuous variation
    c. Distribution method
    d. Solubility method

17. _____is a versatile complexometric agent.
    a. Ethylene diamine tetra acetic acid
    b. Iodine
    c. Sodium hydroxide
    d. Hydrochloric acid

18. The quantity of strong acid or base that must be added to change the pH of one liter of solution by one pH unit is known as
    a. Buffer equivalent
    b. Buffer capacity
    c. Equivalence point
    d. Buffer action

19. Range of pH scale is
    a. 7 to 10
    b. 0 to 10
    c. 0 to 14
    d. 7 to 14

20. In which method, tonicity is calculated by adding water to the drug to make an isotonic solution?
    a. Sodium chloride equivalent Method
    b. Cryoscopic Method
    c. White Vincent Method
    d. Freezing point depression method

Q.2. Answer **any two** questions 20 M

1. Explain the process of solvation and discuss factors affecting solubility of drugs in liquids.
2. Explain the concept of surface tension and deduce an equation for determination of surface tension by drop count method with a neat labeled diagram.
   In the determination of surface tension of a liquid by the drop-number method, it gives 35 drops while water gives 18 drops for the same volume. The densities of the liquid and water are 0.996 and 0.800 g/cm3 respectively. Find the surface tension of the liquid if that of water is 72.0 dynes/cm.
3. Define polymorph and explain its different types. Elaborate on significance of polymorphism in pharmaceuticals with examples.

Q.3. Answer **any seven** questions 35 M

1. What is distribution law? Give its limitations and applications.
2. Write a note on solubility of gas in liquids.
3. Define adsorption isotherm. Discuss different types of adsorption isotherms.
4. Define dipole moment and give its significance in structural elucidation.
5. Classify complexes and explain metal complexes in detail.
6. Explain any one Class I method to adjust isotonicity. Calculate the amount of sodium chloride required in producing a 200 mL solution of 1% apomorphine hydrochloride isotonic with blood serum? (Given: Freezing point depression of 1% apomorphine = 0.08). Freezing point depression of 1% w/v sodium chloride is 0.576°C.
7. Derive the buffer equation for a weak acid and its salt. Calculate pH of the buffer solution containing 0.5 M each of acetic acid and sodium acetate, respectively. (Given: pKa of acetic acid is 4.76).
8. Enlist different methods used in analysis of complexes and explain any one in detail
9. What is protein binding? Write a note on the significance of drug-protein binding.