Time: 3 Hours   **Marks: 75**

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

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

1. The solubility of drugs in a given solvent is due _____
   a. Cohesive forces
   b. Solute - solute interactions
   c. Solute-solvent interactions
   d. Solvent-solvent interactions

2. When one part of solute is soluble in 9 parts of solvent, then the solute is:
   a. Very soluble
   b. Freely soluble
   c. Soluble
   d. Sparingly soluble

3. The rate of diffusion of drug across the biological membrane and the concentration gradient are _____
   a. Directly proportional
   b. Inversely proportional
   c. Exponential
   d. Log linear

4. The terms upper consolute temperature and lower consolute temperature are related to:
   a. Cloud point
   b. Critical solution temperature
   c. Kraft point
   d. Phase inversion

5. The partition coefficient is a measure of
   a. Viscosity of drug
   b. Molecular weight of drug
   c. Lipophilicity of drug
   d. Pharmacological action of drug

6. Latent heat of fusion means changing of phase from:
   a. Solid to liquid
   b. Liquid to gas
   c. Gas to liquid
   d. Liquid to solid

7. What kind of liquid crystals consist of parallel molecules in layers?
   a. Cholesteric
   b. Nematic
   c. Smectic
   d. All of the above

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8. Relative humidity is measured by using _____
   a. Hygrometer
   b. Manometer
   c. Viscometer
   d. Stalagmometer

9. The structural elucidation of geometric isomers can be decided by one of the following:
   a. Dielectric constant
   b. Dipole moment
   c. Optical rotation
   d. Refractive index

10. As the dielectric constant values increases, the polarity of the solvents _____
    a. Decreases
    b. Increases
    c. Remains constant
    d. Decreases and then remains constant

11. The difference between work of adhesion and work of cohesion is called
    a. Spreading coefficient
    b. Surface tension
    c. Interfacial tension
    d. Wetting phenomenon

12. At concentrations below the critical micelle concentration, the surfactant molecules remain:
    a. In the bulk of the water
    b. Above the surface of water
    c. At the air-water interface
    d. Uniform in the bulk and interface

13. Which of the following is an assumption of Langmuir Adsorption isotherm:
    a. The surface of a solid possesses a fixed number of active sites for the adsorption of gases
    b. At maximum adsorption, the gas layer around the solid is found to be multilayered
    c. The rate of adsorption is proportional to the occupied sites
    d. The rate of desorption is proportional to the unoccupied sites

14. The HLB range for lipophilic surfactants is:
    a. 2 to 9
    b. 9 to 16
    c. 16 to 20
    d. Above 20

15. Complexation does not ordinarily involve formation of
    a. Covalent bonds
    b. Coordinate bonds
    c. Hydrogen bonds
    d. Hydrophobic bonds

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16. The cytotoxic drug cisplatin is an example of
   a. Metal ion complex
   b. Olefin complex
   c. Inclusion complex
   d. Organic molecular complex

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

18. Which among the following is a Class-I method used for rendering a solution of a drug isotonic with blood plasma?
   a. Cryoscopic method
   b. White-Vincent method
   c. Sprowls method
   d. Hammarlund method

19. What is the pH of 0.01 N potassium hydroxide solution?
   a. 10
   b. 11
   c. 12
   d. 13

20. The amount of acid or base that can be added before the pH begins to change significantly is known as
   a. Buffer equivalent
   b. Buffer capacity
   c. Equivalence point
   d. Buffer action

Q.2. Attempt ANY TWO from the following   (20 Marks)

1. Classify solvents with examples. Discuss factors affecting the solubility of drugs in liquids.

2. Write a note on the Refractive index. Describe the principle, construction and working of Abbe's Refractometer.

3. Write a note on Surface Active Agents and Detergency. Explain HLB Scale with applications.

Q.3. Attempt ANY SEVEN from the following   **(35 Marks)**

1. State Raoult's Law. Describe the deviations of Raoult's law with suitable examples.
2. Define diffusion and write a note on Fick's first law of diffusion.
3. Write a short note on Polymorphism.
4. Explain capillary rise method for determination of surface tension.
5. Enlist methods for analysis of complexes. Explain any one method for determination of stability constant of the complex.
6. Write a note on protein binding of drugs and give its applications.
7. Classify complexes with examples and write a note on Organic molecular complexes.
8. Describe any one method for pH determination.
9. Classify methods for adjustment of isotonicity and give the principle of each class. Calculate the concentration of sodium chloride required for making a 1.5% solution of cocaine hydrochloride isotonic with blood plasma. (Freezing point depression of 1% solution of sodium chloride is 0.576°C and that of 1% solution of cocaine hydrochloride is 0.098°C).

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