(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 of scientific calculators is allowed

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

1. When oil is dispersed in a polar solvent using surfactants, the process is called
   A. Polarization
   B. Emulsification
   C. Gelatinization
   D. Solubilization
2. A liquid mixture that has a constant boiling point and whose vapor has the same composition as the liquid
   A. Azeotropic Mixture
   B. Zeotropic Mixture
   C. Conjugate Solution
   D. Critical Solution
3. 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
4. Solvation of a solute with water is called as
   A. Hydration
   B. Sublimation
   C. Crystallization
   D. Vaporization
5. The increase in solubility of a non-polar drug in water on addition of water miscible organic liquid is known as
   A. Dissolution
   B. Cosolvency
   C. Solubilization
   D. Hydrotrophy
6. Which of the following is referred as mesomorphic state
   A. Liquid crystal
   B. Liquid complex
   C. Metastable form
   D. Amorphous state
7. The principle of Abbe's refractometer is based on measurement of _____
   A. Critical angle
   B. Critical surface tension
   C. Contact angle
   D. Critical temperature

8. The ability for a compound to exist in more than one crystal form is known as
    A. Isomerism
    B. Amorphism
    C. Polymorphism
    D. Crystallinity
9. If a molecule is _____, it will exhibit zero dipole moment.
    A. Symmetrical
    B. Asymmetrical
    C. Polar
    D. Semipolar
10. Composition of two or more compounds that exhibits a melting temperature lower than that of any other mixture of the compounds
    A. Critical composition
    B. Eutectic composition
    C. Conjugate composition
    D. Alloys
11. If the difference between spreading coefficient is positive then the liquid will be _____.
    A. Spreadable
    B. Non-spreadable
    C. Immiscible
    D. Miscible
12. A surfactant with a very large Hydrophile-Lipophile Balance (HLB) value i.e. 16-18 are
    A. Solubilizing agents
    B. Anti-foaming agents
    C. Water-in-oil (w/o) emulsifier
    D. Oil-in-water (o/w) emulsifier
13. The surface tension usually decreases with:
    A. Increase in temperature
    B. Decrease in temperature
    C. Addition of electrolytes
    D. Decrease in surface concentration
14. Which of the following substance decrease surface tension of water
    A. Sodium lauryl sulphate
    B. Urea
    C. Calcium carbonate
    D. Kaolin
15. Identify the naturally occurring chelate
    A. Haemoglobin
    B. EDTA
    C. Dimercaprol
    D. Diethylenetriamine
16. _____is a versatile complexometric agent.
    A. Ethylene diamine tetra acetic acid
    B. Iodine
    C. Sodium hydroxide
    D. Hydrochloric acid

17. Which of the following factor mainly affects protein binding
    A. Lipophilicity
    B. Solubility
    C. Physical state
    D. Pressure
18. What is Henderson-Hasselbach equation for weak acid
    A. pH = pka + log [Salt]/[Acid]
    B. pH = pka + log [Acid]/[Salt]
    C. pH = pka + log [Base]/[Acid]
    D. pH = pka – log [Base]/[Acid]
19. Shrinking of blood cells takes place in_____ solution.
    A. Hypertonic
    B. Hypotonic
    C. Isotonic
    D. Neutral
20. Buffer capacity can be defined as the ratio of increment of strong base or strong acid to the_____
    A. Change in pH
    B. Change in buffer capacity
    C. Change in osmotic pressure
    D. Change in temperature

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

1. Elaborate on factors affecting solubility of drugs and explain with examples polar, nonpolar, and semi-polar solvents.
2. Write a note on surfactants and HLB systems.
3. Write a note on dipole moment and its applications

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

1. Explain any one method for the determination of interfacial tension.
2. State Nernst distribution law. Give its limitations and applications in pharmacy.
3. What are liquid crystals? Explain the types and applications of liquid crystals.
4. Enlist the methods of analysis of complexes with examples and explain any one method in detail.
5. Classify methods of adjustment of isotonicity. Calculate the amount of sodium chloride required for preparing 100 mL of 1% Physostigmine Salicylate solution isotonic with blood serum? [Given: Sodium Chloride equivalent of Physostigmine Salicylate(E) is 0.16].
6. Define buffers and write a note on biological buffers.
7. Explain inclusion complexes in detail.
8. Explain the concept of protein binding and give its significance.
9. Write a note on diffusion and state Fick's First law of diffusion.
