

(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. Solvents having large dipole moment are known as
  - A. Protic solvents
  - B. Polar solvents
  - C. Aprotic solvents
  - D. Cosolvents
2. ----- 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
3. A solution of two liquids boils at a temperature lower than the boiling point of either of them. Hence, the binary solution shows \_\_\_\_\_.
  - A. Negative deviation from Raoult's law
  - B. Positive deviation from Raoult's law
  - C. No deviation from Raoult's law
  - D. Positive or negative deviation from Raoult's law depending upon the composition
4. Fick's law is used for the study of \_\_\_\_\_.
  - A. Dissolution
  - B. Disintegration
  - C. Diffusion
  - D. Dissociation
5. For the study of distribution law, the two solvents should be:
  - A. Miscible
  - B. Immiscible
  - C. Volatile
  - D. Reacting with each other
6. As the temperature increases, physical adsorption
  - A. Remains constant
  - B. Decreases
  - C. Increases
  - D. First increases then decreases

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. Higher the HLB value of surfactant, more \_\_\_\_\_ it is
- A. Hydrophilic
  - B. Lipophilic
  - C. Amphiphilic
  - D. Water insoluble
9. When the added molecules are partitioned in favor of the interface, it is called
- A. Positive adsorption
  - B. Negative absorption
  - C. Negative adsorption
  - D. Positive absorption
10. A crystalline solid
- A. Exhibits isotropy
  - B. Does not have sharp melting point
  - C. Has orderly arrangements of units
  - D. Has random arrangement of units
11. A molecule at zero dipole will be
- A. Symmetrical
  - B. Asymmetrical
  - C. Curved
  - D. Angular
12. \_\_\_\_\_ is categorized as mesophase.
- A. Liquid complex
  - B. Liquid crystal
  - C. Solid
  - D. Liquid
13. Optical Rotation is \_\_\_\_\_ property.
- A. Constitutive
  - B. Extensive
  - C. Colligative
  - D. Additive
14. The ability for a compound to exist in more than one crystal form is known as
- A. Isomerism
  - B. Amorphism
  - C. Polymorphism
  - D. Crystallinity

15. Iodine forms a stable complex with
  - A. Polyvinyl pyrrolidone
  - B. Polyethylene glycol
  - C. Chitosan
  - D. Sodium carboxymethyl cellulose
16. Which is a cage-like lattice in which the coordination compound is entrapped?
  - A. Layer type
  - B. Channel type
  - C. Monomolecular complex
  - D. Clathrates
17. ....is the most abundant protein that serves as a carrier for most of the drug molecules.
  - A. Albumin
  - B. Globulin
  - C. Chlorophyll
  - D. EDTA
18. What is the pH of 0.001 M HCl?
  - A. 1
  - B. 3
  - C. 11
  - D. 2
19. Body fluids have osmotic pressure corresponding to that of 0.9% NaCl. Thus, a 0.9% NaCl solution is
  - A. Hypotonic
  - B. Isotonic
  - C. Hydrotropic
  - D. Hypertonic
20. What is Henderson-Hasselbach equation for weak acid
  - A.  $\text{pH} = \text{pka} + \log [\text{Salt}]/[\text{Acid}]$
  - B.  $\text{pH} = \text{pka} + \log [\text{Acid}]/[\text{Salt}]$
  - C.  $\text{pH} = \text{pka} + \log [\text{Base}]/[\text{Acid}]$
  - D.  $\text{pH} = \text{pka} - \log [\text{Base}]/[\text{Acid}]$

**Q.2. Answer any TWO questions from the following (20 Marks)**

1. What is Raoult's law for ideal solutions? Explain in detail deviations from Raoult's law.
2. Explain the concept of surface tension and any one method to determine surface tension.  
 In the determination of surface tension of a liquid by the drop-weight method, weight of one drop of water and benzene is found to be 0.15 gm and 0.9 gm respectively. Find the surface tension of the benzene if that of water is 72.0 dynes/cm.
3. Write short notes on:
  - a. Aerosol
  - b. Polymorphism

**Q.3. Answer any SEVEN questions from the following**

**(35 Marks)**

1. State Nernst distribution law. Give its imitations and applications in pharmacy.
2. Write a note on Fick's first law of diffusion.
3. What is optical activity? With a neat labeled diagram explain the principle and working of polarimeters.
4. Explain Langmuir adsorption isotherms in detail.
5. Define complexation. Write a note on protein binding.
6. Enlist the methods of analysis of complexes with examples and explain any one method in detail.
7. Explain inclusion complexes in detail.
8. Write a short note on biological buffers. Calculate the pH of a buffer solution containing 0.3 moles/litre of acetic acid and 0.3 moles/litre of sodium acetate. (pka for acetic acid is 4.57)
9. Classify the methods to adjust tonicity and explain any one class I method.