

Total No. of printed pages = 7

BP 302 T

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2018

B.Pharm. 3rd Semester End-Term Examination
PHYSICAL PHARMACEUTICS – I – THEORY
(New Regulations)

(w.e.f. 2017–2018)

Full Marks – 75

Time – Three hours

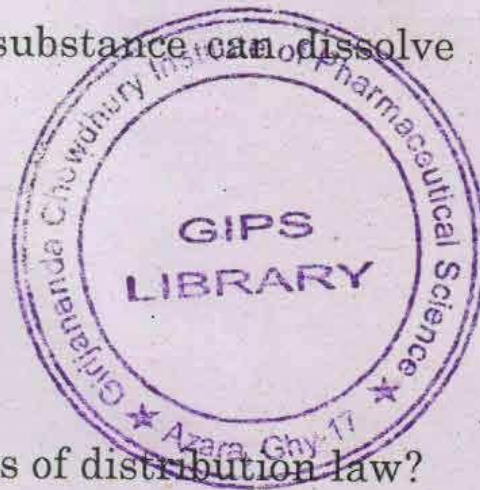
The figures in the margin indicate full marks
for the questions.

1. Answer the following: (20 × 1 = 20)
- (i) A system is described as liquid-liquid systems, which of the colligative property is applicable:
- (a) Depression in the freezing point
 - (b) Elevation in the boiling point
 - (c) Lowering of vapour pressure
 - (d) Osmotic pressure
- (ii) The following is not a partially miscible liquids
- (a) Phenol-water
 - (b) Carbon disulfide-methanol
 - (c) Water-aniline
 - (d) Methanol-water
- (iii) Glass is a type of
- (a) Crystalline solid
 - (b) Amorphous solid
 - (c) Liquid crystals.
 - (d) All of the above

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- (iv) At concentrations below CMC, the surfactant molecules remain
- (a) Above the surface of water
 - (b) At water-air interface
 - (c) In the bulk of water
 - (d) Uniform in bulk and water
- (v) The HLB range for wetting agent is
- (a) 7 to 9
 - (b) 16 to 18
 - (c) 1 to 3
 - (d) 8 to 16
- (vi) Which of the following liquid pairs shows a positive deviation from Raoult's law
- (a) Acetone-chloroform
 - (b) Benzene-methanol
 - (c) Water-HCl acid
 - (d) Water-nitric acid
- (vii) Buffer capacity is maximum at the
- (a) $pK_a < pH$
 - (b) $pK_a = pH$
 - (c) $pK_a > pH$
 - (d) $pK_a = \text{concentration}$
- (viii) Which is the factor frequently used for preparing saturated solutions
- (a) Addition of co-solvent
 - (b) Addition of immiscible solvent
 - (c) Initially maintaining high temperature
 - (d) providing agitation

- (ix) Which of the following substance can dissolve in water?
- (a) $\text{CH}_3\text{CH}_2\text{CH}_3$
 - (b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$
 - (c) $\text{CH}_3\text{CH}_2\text{CHO}$
 - (d) $\text{CH}_3\text{CH}_2\text{COOH}$
- (x) Which is not a limitations of distribution law?
- (a) Dilute solution
 - (b) Mixing time
 - (c) Non-miscibility of liquid phases
 - (d) Same molecular state
- (xi) In Bragg's equation for diffraction by X-rays, n represents
- (a) Avogadro's number
 - (b) Normality
 - (c) An integer
 - (d) Quantum number
- (xii) Which of the following is normally seen in pharmaceutical drug molecules
- (a) Cubic
 - (b) Hexagonal
 - (c) Rhombohedral
 - (d) Tetragonal
- (xiii) If sodium chloride is added to phenol-water system CST
- (a) Decreases
 - (b) Increases
 - (c) Remains same
 - (d) None of the above



- (xiv) A buffer solution contains 0.36 M sodium acetate and 0.45 M acetic acid ($pK_a=4.8$) what is the pH of the solution
- (a) 3.8
 - (b) 4.7
 - (c) 6.1
 - (d) 5.2
- (xv) Hemolysis is observed in one of the following solutions.
- (a) Hypertonic solution
 - (b) Hypotonic solutions
 - (c) Isotonic solution
 - (d) All of the above
- (xvi) Which of the following law is nearly related to Nernst distribution law:
- (a) Dalton's law
 - (b) Henry's law
 - (c) Ideal law
 - (d) Raoult's law
- (xvii) Real gases show remarkable deviation from that of ideal gas behavior under the following conditions
- (a) High temperature and high pressure
 - (b) High temperature and low pressure
 - (c) Low temperature and high pressure
 - (d) Low temperature and low pressure

- (xviii) In co-ordinate complexes, the function of a ligand is:
- (a) Accepts a pair of electrons
 - (b) Accepts one electron and share it
 - (c) Donates a pair of electrons
 - (d) Donates one electron and share it
- (xix) Dielectric constant measures the capacity:
- (a) Altering the optical rotation by the molecules
 - (b) Developing optical activity of molecules
 - (c) Inducing dipoles in the neighbouring molecules
 - (d) Rotating the line of refraction of the liquid
- (xx) The following property is used to identify the purity of drug substance
- (a) Specific rotation
 - (b) Refractive index
 - (c) Dipole moment
 - (d) Dielectric constant

2. Answer the following questions (answer any Seven)
(7 × 5 = 35)

- (a) Define solvation and association. Explain the factors influencing the solubility of gases in liquids. (5)
- (b) Outline the difference between liquid crystals and liquid complexes. Write their applications. (5)

- (c) Explain the properties of refractive index and optical rotation in the elucidation of the chemical structure giving examples. (5)
- (d) Distinguish crystalline and amorphous state. Write the significance of polymorphism in pharmacy. (5)
- (e) What is interfacial tension? Explain any one method for measurement of surface tension. (5)
- (f) Classify inclusion complexes. Describe the nature of intermolecular interactions in beta-cyclodextrin inclusion complexes. Write its pharmaceutical applications. (5)
- (g) What is BET equation? With a phase diagram explain the Freundlich adsorption isotherm. (5)
- (h) Explain solubility method with examples for determination of equilibrium stability constant. (5)
- (i) Write short notes on: (any two) (2.5+2.5=5)
- (i) Spreading co-efficient and its applications
 - (ii) Nernst distribution law and its importance
 - (iii) Phenol-water system as partially miscible liquids.

3. Answer the following questions: (Any Two).
(2 × 10 = 20)

- (a) (i) State Raoult's law. Describe with examples the positive and negative deviations from the law. (6)
- (ii) Outline the colligative properties. Derive an expression for the determination of molecular mass of solute using elevation of boiling point. (4)

- (b) (i) What is buffer capacity? What are physiological buffers maintained by human body? (4)
- (ii) What is HLB scale? Explain the method of micellar solubilization of drugs using surfactant. (6)
- (c) (i) What are eutectic mixtures? Write its applications in pharmacy. (4)
- (ii) Write two applications of drug protein binding in drug activity. Describe one experimental method for studying drug-protein binding. (6)

