

2. Discuss five different methods of analysing complexes. (5)
3. What are latent heats? Explain latent heat of vaporisation and latent heat of fusion. With a neat diagram, briefly explain sublimation graph. (1+2+2=5)
4. Briefly explain refractive index. What are its applications in pharmacy? (2+3=5)
5. Write the equations of Hansen and Hildebrand solubility parameters. Briefly explain its applications. (2+3=5)
6. What are inclusion/occlusion compounds? Briefly explain the different types of inclusion/occlusion compounds. (1+4=5)
7. What are surfactants? How will you classify surfactants according to their structure? (1+4=5)
8. Write a note on eutectic mixtures. (5)
9. Discuss about the buffers in biological system. (5)

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UG Odd Semester (CBCS) Examination, 2022  
held in March 2023

**PHARMACEUTICAL SCIENCES**

**(3<sup>rd</sup> Semester)**

**Course No: BP 302T**

**(Physical Pharmaceutics I-Theory)**

Full Marks: 75

Time: 3 Hours

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

**I(A). Multiple choice questions 1x10=10**

1. Crenation takes place in \_\_\_\_\_ solutions.
 

|                |               |
|----------------|---------------|
| (a) hypertonic | (b) isotonic  |
| (c) hypotonic  | (d) semitonic |
2. According to USP, solubility assigned (in mg/mL) for slightly soluble drugs is \_\_\_\_
 

|              |               |
|--------------|---------------|
| (a) 33 mg/mL | (b) 10 mg/mL  |
| (c) 1 mg/mL  | (d) 100 mg/mL |
3. Buffer equation is satisfactory for calculations within the pH range of \_\_\_\_
 

|             |             |
|-------------|-------------|
| (a) 3 to 6  | (b) 4 to 10 |
| (c) 2 to 12 | (d) 1 to 14 |
4. An instrument used to measure optical rotation is \_\_\_\_
 

|                    |                  |
|--------------------|------------------|
| (a) Refractometer  | (b) Spectrometer |
| (c) Diffractometer | (d) Polarimeter  |

5. The partial vapor for benzene in a solution of benzene and ethylene chloride where the mole fraction of ethylene chloride is 0.3 will be \_\_\_\_ mmHg. Given that partial vapor pressure of pure benzene at 50°C is 268 mmHg and the corresponding value for ethylene chloride is 236 mmHg.
- (a) 80.4 (b) 70.8  
(c) 187.6 (d) 165.2
6. Liquid crystalline state resulting from the from the action of certain solvents on solids are called \_\_\_\_\_
- (a) thermotropic liquid crystals  
(b) lyotropic liquid crystals  
(c) lyophobic liquid crystals  
(d) cosolvent liquid crystals
7. If oleic acid ( $\gamma_l = 32.5$  dynes/cm) is placed on top of water ( $\gamma_s = 72.8$  dynes/cm) and the interfacial tension ( $\gamma_{sl}$ ) between the two is 15.6 dynes/cm, then the spreading coefficient is \_\_\_\_\_
- (a) 89.7 (b) 24.7  
(c) 40.3 (d) 57.2
8. \_\_\_\_\_ isotherm indicates the formation of a gas monolayer on the surface of the solid.
- (a) Langmuir isotherm (b) Freundlich isotherm  
(c) BET isotherm (d) Zeta isotherm
9. Debye is the unit of \_\_\_\_\_
- (a) Refractive index (b) Optical rotation  
(c) Dipole moment (d) Dielectric constant
10. This buffer consists of boric acid, sodium borate and sufficient sodium chloride to make the solution

isotonic. It is used in ophthalmic preparations in the pH range of 7 to 9. What is this buffer?

- (a) Gifford buffer  
(b) Sorensen buffer  
(c) Clark and Lubs buffer  
(d) Palitzsch , Hind and Goyan buffer

**I(B). Objective type(Answer the following in brief)**

2x5=10

1. What are adhesive and cohesive forces?
2. Mention the central atom of the chelates chlorophyll and hemoglobin.
3. Give one example each for bidentate and polydentate ligands.
4. What is critical micelle concentration?
5. Mention any four solutions isotonic with blood.

**II. Long answers (Answer two out of three questions)**

10x2=20

1. Derive an equation for capillary rise method of surface tension measurement. Discuss HLB system of surfactant classification.
2. What is buffer capacity? Discuss. Write the significance of liquid crystals in pharmacy.
3. Discuss about pharmacopoeial expression of solubility. What are the factors affecting solubility of gases in liquid?

**III. Short answers (Answer seven out of nine questions)**

5x7=35

1. What are ideal solutions? Explain negative and positive deviations from Raoult's law. (1+4=5)