

QP Code: **21791**

(3 Hours)

[Total Marks : 70

- N.B.: (1) All questions are compulsory.  
(2) Draw neat labelled diagrams wherever necessary.

- I. (a) If the pH of a solution is 4.72, what is the hydronium ion concentration? 2  
(b) What is Henry's law? State its application. 3  
(c) What is half-life of a reaction and show that half-life of a first order reaction is independent of concentration. 3  
(d) Describe spreading of liquids and write a note on spreading coefficient. 3  
(e) Write a note on ion sensitive electrodes. 2  
(f) What are colloids. Give the characteristics of lyophobic colloids. 3
2. (a) Explain buffers in pharmaceutical and biological systems. 4
- OR**
- (a) What is tonicity? Classify different methods for adjusting tonicity and explain Class I methods in detail. 4  
(b) What is phase rule? Explain the effect of temperature on partially miscible liquids. 4  
(c) A first order reaction is one-fifth completed in 40 minutes. Calculate the rate constant. 3
3. (a) What is partition phenomena and give its applications in pharmacy. 4  
(b) Give Arrhenius equation and give its importance in pharmacy. 4
- OR**
- (b) Enlist the various methods to determine order of a reaction and explain any two in detail. 3  
(c) What is contact angle and how does it indicate the wetting of a solid by a liquid? 3
4. (a) Derive the Henderson-Hasselbach equation for a weak acid? 4  
(b) Draw a neat labelled diagram of Daniel cell and enlist different types of electrodes. 3  
(c) Explain the optical properties of colloids. 4
- OR**
- List the different methods for preparation of colloids and explain any one method in detail.
5. (a) Give the concepts and applications of accelerated stability studies in pharmacy. 3  
(b) What is adsorption isotherm and derive equation for Langmuir Adsorption isotherm. 4  
(c) Write a note on the protective action of colloids. 4

**OR**

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- (c) Write a note on Gold number and Schultz Hardy Rule.
6. (a) For a certain first order reaction  $t_{0.75}$  is 120 seconds. How long will it take for the reaction to be completed 75%? 3
- (b) Define surface tension. Explain capillary rise method for the determination of surface tension. 4
- (c) Write a note on concentration cells.
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