Exam Session: First Half 2019

Year/Semester: 1P00122 - F. Y. B. Pharm. Sem-II (CBSGS)

Subject: 65701/ Physical Pharmacy II

QP code : 70326

Date of Examination: 9/4/2019 **Time : 2:30 pm – 5:30 pm** **Marks: 70 M.**

Q1. a. Calculate the hydroxyl ion concentration of a solution having pH 3.5 (pKw = 14)

pOH = pKw – pH = 14 – 3.5 = 10.5 (1 mark)

OH^- = Antilog of (-10.5) = 3.16×10^{-11} (1 mark)

b. Explain Henry's law in detail.

State Henry's Law (1 mark)

Explanation (2 marks)

c. Define i) half-life ii) order of reaction and derive equation for half-life of first order reaction.

Definition (1mark each)

Derivation of half-life (1 mark)

d. Discuss the concept of spreading of liquids.

Explanation and Derivation of spreading coefficient (3marks)

e. Write a brief note on oxidation reduction indicators

Brief explation with example (2 marks)

f. Differentiate between lyophobic and lyophilic colloids.

4 points of differentiation (½ mark for each point)

2. a. Define buffers. Write a note on biological buffers.

Definition of buffer (1 mark)

Note on biological buffers with examples (3 marks)

OR Enlist methods to determine isotonicity and explain any one method in detail.

Enlist methods (1 mark)

Explain any one method (3 marks)

b. What is Phase rule? Explain a two component system.

State phase rule and name each parameter (1 mark)

Explain any one two component system with graph (3 marks)

c. What are pseudo first order reaction? Derive an equation for reaction rate constant of first order reaction.

Define pseudo first order reaction	(1 mark)
Derivation	(2 marks)

3. a. Define Partition coefficient and give its applications.

Definition	(2 marks)
Any 4 applications	(2 marks)

b. Explain the relation of temperature with rate of reaction. (4 marks)

OR What are the different methods to determine order of reaction? Explain any two methods.

Names of methods	(1 mark)
Explain any two methods	(1 1/2 marks for each method)

c. Explain Langmuir Adsorption isotherm.

Derivation	(3 marks)

4. a. Explain Sorensen's pH scale and derive equation for acidic buffers.

Sorensens pH scale	(1 mark)
Derivation	(3 marks)

b. Classify different types of electrodes and explain Calomel electrode.

Classification	(1 mark)
Calomel electrode	(2 marks)

c. Discuss methods of preparation of lyophobic colloids.

Any two methods in detail	(2 marks for each method)

OR Write a note on Kinetic properties of colloids

Details on all kinetic properties like brownian motion, sedimentation, viscosity, etc.	(4 marks)

Q5a. Collision theory

Martin's Physical Pharmacy, 6th Edition, Chapter 14, Chemical Kinetics & Stability, pg. 610

b. i. Define wetting and contact angle

Martin's Physical Pharmacy, 6th Edition, Chapter 15, Interfacial Phenomena, pg. 697

ii. Differentiate between physical and chemical adsorption

Martin's Physical Pharmacy, 6th Edition, Chapter 15, Interfacial Phenomena, pg. 688

c. Gold number and Schultz Hardy rule OR protective colloids

Martin's Physical Pharmacy, 6th Edition, Chapter 16, Colloidal Dispersions, pg. 735-737

Q6a. The half-life of a first order reaction is 25 minutes. What will be the concentration of the reactant remaining after 70 minutes?

Step 1: Find rate constant from half-life. $K = 0.693/t1/2$

$K = 0.0277\ min^{-1}$ (1 mark)

Step 2: First order rate equation: $k = 2.303/t.\ log[a/(a-x)]$

Substitute in the above equation: $0.0277 = 2.303/70\ log[100/(a-x)]$ (1 mark)

Find (a-x);

Ans. Concentration remaining = 14.37% (1 mark)

b. Define surface tension and explain capillary rise method.

Surface tension: The force per unit length that must be applied *parallel* to the surface so as to counterbalance the net inward pull. This force, the surface tension, has the units of dynes/cm in the cgs system and of N/m in the SI system.

Capillary rise method: Martin's Physical Pharmacy, 6th Edition, Chapter 15, Interfacial Phenomena, pg. 660-662.

c. State Nernst equation and write a note on ion sensitive electrodes.

Martin's Physical Pharmacy, 5th Edition, Chapter 8, Electromotive force and Oxidation Reduction, pg. 199