

KATHMANDU UNIVERSITY
End Semester Examination [C]
June/July 2024

Marks Scored:

Level : B.Pharm.

Year : II

Exam Roll No. :

Time: 30 mins.

Course : PHAR 220

Semester : I

F. M. : 20

Registration No.:

Date

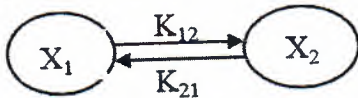
08 JUL 2024

SECTION "A"

[20Q. × 1 = 20 marks]

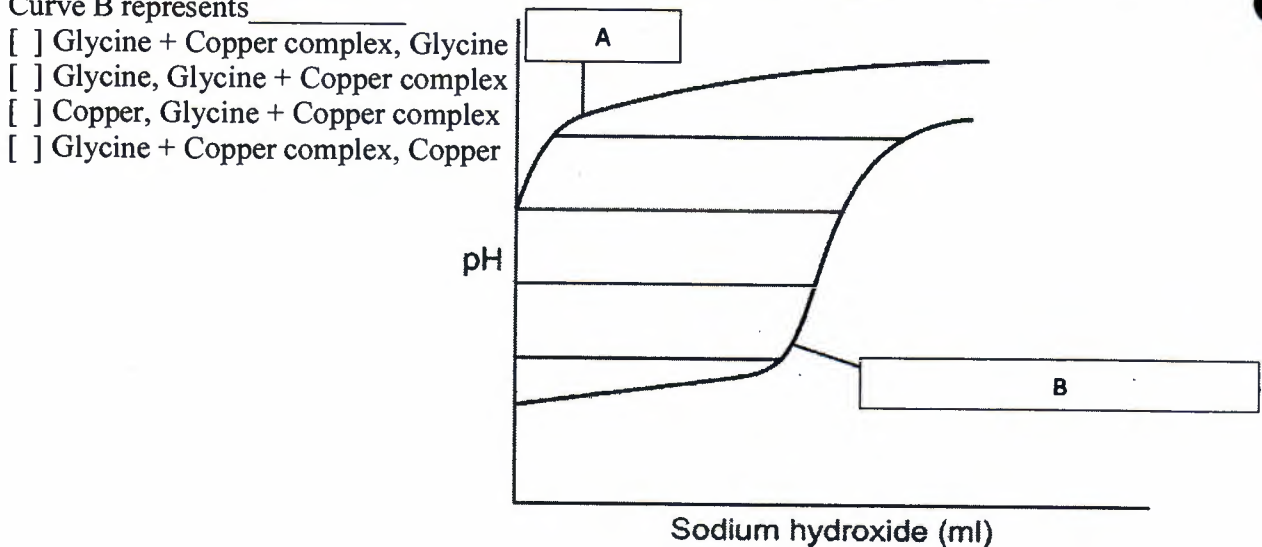
Choose and encircle the most appropriate option from each set of choices.

- For a zero-order degradation:
 A plot of concentration versus time yields a straight line
 A plot of the logarithm of concentration versus time yields a straight line
 A plot of 1/concentration versus time yields a straight line
 A plot of the concentration versus logarithm of time yields a curved line
- According to ICH guidelines on stability testing what is the protocol for accelerated conditions for solid orals:
 40°C/65% relative humidity
 30°C/65% relative humidity
 40°C/75% relative humidity
 30°C/75% relative humidity
- _____ is the suitable differential equation for the following schematic reaction.



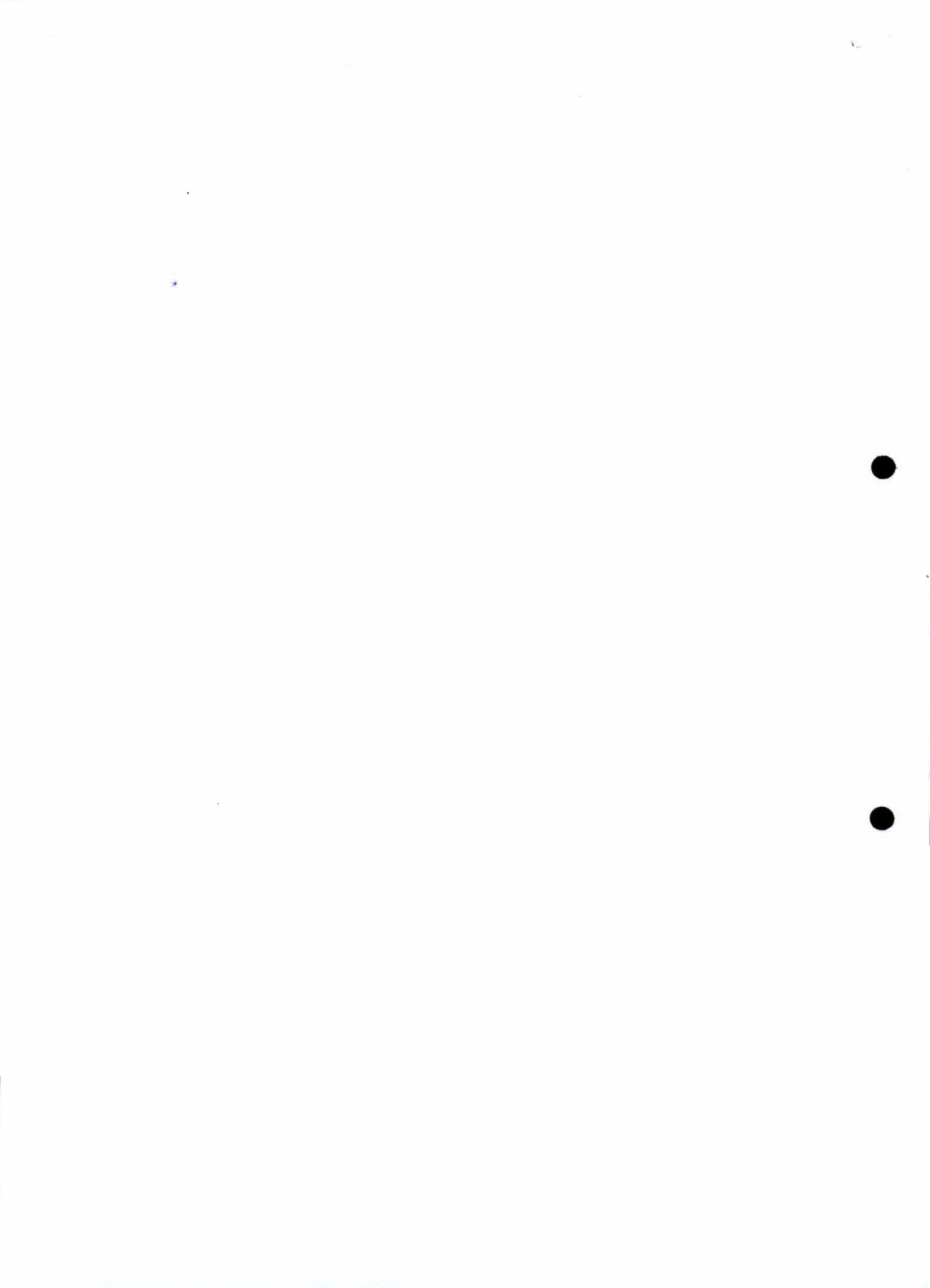
- $-dX_1/dt = K_{21} \cdot X_2 - K_{12} \cdot X_1$
 $-dX_1/dt = K_{21} \cdot X_1 - K_{12} \cdot X_2$
 $-dX_1/dt = K_{12} \cdot X_2 + K_{21} \cdot X_1$
 $-dX_1/dt = K_{12} \cdot X_2 - K_{21} \cdot X_1$
- A surfactant with a very large Hydrophile-Lipophile Balance (HLB) value (e.g. 40) is expected to function as a:
 Anti-foaming agent
 Oil in water (o/w) emulsifier
 Water in oil (w/o) emulsifier
 Solubility enhancer
- The Brownian motion is due to
 Temperature fluctuation within the liquid phase
 Attraction and repulsion between charges on the colloidal particles
 Impact of the molecules of the dispersion medium on the colloidal particles
 Convective currents
- In a multi-step reaction mechanism, which step determines the overall reaction rate?
 The first step
 The last step
 The slowest step
 The fastest step

7. Which of the following statements is TRUE about a catalyst?
 It increases the activation energy of a reaction.
 It is consumed in the reaction.
 It is always in the same phase as the reactants.
 It provides an alternative pathway with a lower activation energy.
8. Which of the following statements is true about the critical micelle concentration (CMC)?
 It is the concentration above which surfactants start to form micelles.
 It is the concentration below which surfactants start to form micelles.
 It is the concentration at which the surface tension is maximum.
 It is the concentration at which the viscosity is minimum
9. Which of the following is an example of a colloidal system?
 Salt solution Sugar solution Milk Pure water
10. Which of the following factors affects the rate of dissolution?
 Temperature Surface area of the solute
 Agitation or stirring All of the above
11. Which one of the following is the correct order of the drugs binding to various plasma proteins?
 Albumin > a1 acid glycoproteins > globin > lipoproteins
 Albumin > globin > lipoproteins > a1 acid glycoproteins
 Albumin > a1 acid glycoproteins > lipoproteins > globin
 Albumin > lipoproteins > globin > a1 acid glycoproteins
12. Which of the following methods is/are used to measure unbound drug concentration
 Dynamic dialysis Equilibrium dialysis
 Ultrafiltration All of the above
13. A titration curve is generated by titrating the glycine solution with a standard sodium hydroxide solution and plotting the resulting pH against the volume of sodium hydroxide added. Subsequently, the titration curve is obtained by adding sodium hydroxide to the solution containing glycine and copper salt. Curve A represents _____, while Curve B represents _____



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14. A plastic material was found to have yield value of 5000 dyne/cm². At shearing stress above the yield value, stress was found to increase linearly with rate of shear. If the rate of shear was 125 s⁻¹ when stress was 7500 dyne/cm², calculate the plastic viscosity of the sample.
 20 poise 30 poise 40 poise 50 poise
15. A eutectic mixture is a mixture of:
 Two compounds with a density lower than those of either component
 Two compounds with a sharp melting point lower than those of either component
 Two compounds with a sharp melting point higher than those of either component
 Two compounds with a sharp melting point equal to that of either component
16. The kinematic viscosity is related to absolute viscosity by:
 Density Diameter Kinetic energy Potential energy
17. When boric acid is distributed between water and amyl alcohol at 25 °C, the concentration in water is found to be 0.0510 mole/liter and in amyl alcohol it is found to be 0.0155 mole/liter. What is the distribution coefficient(K(w/al))?
 2.33 3.29 0.304 0.704
18. What is the maximum buffer capacity of an acetate buffer with a total concentration of 0.020 mol/L?
 0.012 0.033 0.056 0.089
19. Calculate the amount in grams of NaCl require to prepare 25 ml of a 1% drug 'Z' solution isotonic to blood. The freezing-point depression of 1% NaCl, drug 'Z' and blood is 0.576°C, 0.109°C and 0.52°C, respectively.
 0.884 0.273 1.092 0.221
20. In the inorganic metal complexes, coordination number means the number of
 Ionic bonds that a metal can form with another metal
 Ionic bonds that a ligand can form with a metal
 Non Ionic bonds that a metal can form with ligands
 Ionic bonds that a metal can form with the ligands



KATHMANDU UNIVERSITY
End Semester Examination [C]
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Level : B.Pharm.
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Course : PHAR 220
Semester : I
F. M. : 55

SECTION "B"

[5 Q. × 3 = 15 marks]

Attempt *ANY FIVE* questions

1. Define activation energy and its significance in chemical kinetics.
2. Define surfactant. Explain about the cleansing action of surfactant.
3. Explain on Hydrophilic-lipophilic Balance (HLB) and its application.
4. State the Fick's laws of diffusion and its significance.
5. Calculate the F value for a system consisting of [1×3=3]
 - a. Liquid water and its vapor
 - b. Liquid ethyl alcohol and vapor
 - c. Liquid water, Liquid ethyl alcohol and vapor
6. A sample of powdered drug, density 5.60 g/cm^3 , is allowed to settle under the acceleration of gravity, 981 cm/s^2 , at 25°C . The rate of settling, v , is $7.30 \times 10^{-3} \text{ cm/s}$. The density of the medium is 1.01 g/cm^3 , and its viscosity is 0.01 g/cm s . Calculate the Stokes' diameter of the drug powder. [2×1.5=3]
7. Write a short note (*ANY TWO*)
 - a. Negative rheopexy
 - b. Biological buffers
 - c. Arrhenius theory of Electrolytic dissociation

SECTION "C"

[5 Q. × 5 = 25 marks]

Attempt *ANY FIVE* questions.

8. Define order of reaction. How do you determine the order of a reaction with respect to a particular reactant?
9. What is surface tension? Describe the various techniques to determine surface tension.
10. Define colloidal dispersion. How can colloids be distinguished from other types of dispersions?
11. You have prepared a flocculated particles in concentrated suspension of calamine in your company.
 - a. Which type of flow is exhibited by this suspension? Explain the characteristics of this flow. [2]
 - b. Discuss the reasons for this type of flow? [3]

12. Explain the various factors affecting the solubility of solids in liquids.
13. Draw a phase diagram and explain the equilibria in detail of the system with $C=3$ in $P=1$ apply phase rule.
14. What is the pH of a solution containing 0.05 M ammonia and 0.05 M ammonium chloride? The K_b of ammonia at 25°C is 1.80×10^{-5} .

SECTION "C"

[2 Q. \times 7.5 = 15 marks]

Attempt *ANY TWO* questions.

15. Explain the concept of diffusion and dissolution testing and its importance in quality control. How can we perform diffusion as well as dissolution study in lab?
16. Explain and describe the powder's derived properties and its application in pharmaceutical formulation.
17. Define the stability constant and stoichiometric ratio of the complex. Enumerate the methods to determine stability constant, and describe each method in detail.