

KATHMANDU UNIVERSITY
End Semester Examination
January/February, 2025

Marks Scored:

Level : B.Pharm.
Year : II

09 FEB 2025

Course : PHAR 220
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date :

SECTION "A"

[20 Q. × 1 = 20 marks]

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

1. What is the unit of rate constant for a first-order reaction?
a. 1/s b. mol/L c. mol/L·s d. L/mol·s
2. Wetting ability of a vehicle can be detected by observing
a. Critical angle b. Contact angle c. Angle of repose d. Interfacial angle
3. The Arrhenius equation relates the rate constant (k) to:
a. Concentration of reactants b. Temperature and activation energy
c. Pressure and volume d. Catalyst used in the reaction
4. What is the primary purpose of a catalyst in a chemical reaction?
a. To increase the temperature of the system
b. To change the equilibrium constant of the reaction
c. To lower the activation energy of the reaction
d. To increase the rate constant without affecting activation energy
5. Electrodialysis method is employed in the colloidal chemistry for the purpose of:
a. Identification b. Preparation c. Purification d. Stabilization
6. According to ICH guidelines on stability testing what is the protocol for accelerated conditions for solid orals:
a. 40°C/65% relative humidity b. 30°C/65% relative humidity
c. 40°C/75% relative humidity d. 30°C/75% relative humidity
7. According to Fick's law of diffusion, the rate of passive diffusion of drugs depends on
a. Lipid solubility of the drug b. Surface area
c. Thickness of the membrane d. all of these
8. What is the role of agitation in the dissolution process?
a. Increases the solubility of the solute
b. Increases the dissolution rate by reducing the boundary layer
c. Decreases the temperature of the solvent
d. Prevents the solute from dissolving
9. What is the role of zeta potential in colloidal systems?
a. It determines the viscosity of the colloid
b. It measures the electrostatic stability of dispersed particles
c. It predicts the phase behavior of emulsions
d. It describes the adsorption of surfactants at interfaces
10. Which of the following describes the critical micelle concentration (CMC)?
a. The concentration of surfactant at which micelles first begin to form
b. The concentration where surfactant becomes insoluble in water
c. The concentration at which surface tension becomes infinite
d. The point where adsorption stops at the liquid-gas interface

11. A graph constructed by plotting $r/[D]$ versus r yields a straight line with the intercept and slope is known as
 a. Scatchard plot
 b. Klotz reciprocal plot
 c. Langmuir Plot
 d. Binding Plot
12. Stokes's law cannot be used if R_e is greater than 0.2 because turbulence appears at this value.
 a. 2
 b. 0.3
 c. 0.2
 d. 3
13. All the statements about porosity are true EXCEPT
 a. It is to be expected that the particles of ordinary powders may have any arrangement intermediate between the two ideal packings, and most powders in practice have porosities between 30% and 50%.
 b. If the particles are of greatly different sizes, however, the smaller ones may shift between the larger ones to give porosities below the theoretical minimum of 26%.
 c. In powders containing flocculates or aggregates, which lead to the formation of bridges and arches in the packing, the porosity may be below the theoretical minimum of 26%.
 d. Crystalline materials compressed under a force of 100,000 lb/in.² can have porosities of less than 1%.
14. _____ have truncated cone structure with a hydrophobic interior cavity because of CH_2 group and a hydrophilic exterior due to presence of hydroxyl group.
 a. Cyclodextrins
 b. Hydroquinone
 c. Graphite
 d. Cholic acid
15. Solvents with low dielectric constants dissolve _____.
 a. Inorganic salts
 b. Organic salts
 c. Sugars
 d. Oils
16. The geometry of complex with coordination number 4 is
 a. Liner
 b. Planer
 c. Square Planer
 d. Square Liner
17. The _____ viscometer works on viscous drag exerted on the body when it is rotated in the fluid whose viscosity is to be determined.
 a. Falling Sphere
 b. Cone and plate
 c. Ostwald's
 d. Capillary
18. Determine the volume of purified water and 0.9% NaCl solution needed to prepare 20ml of 1% w/v solution of hydromorphone HCl ($E=0.22$).
 a. 15.11ml, 4.89ml
 b. 5.11ml, 14.89 ml
 c. 14.89 ml, 5.11ml
 d. 4.89ml, 15.11ml
19. All statements about the dilution of a strong electrolyte are true EXCEPT
 a. Specific conductance κ decreases because the number of ions per unit volume of solution is reduced.
 b. Specific conductance sometimes goes through a maximum before decreasing.
 c. Equivalent conductance of a solution of a strong electrolyte decreases on dilution.
 d. Equivalent conductance of a weak electrolyte also increases on dilution, but not as rapidly at first.
20. Match following binding of drug to protein.

Proteins	Drugs
①. $\alpha 1$ Globulin (Transcortine /Corticosteroid Binding globulin)	a. Ferrous ions.
②. $\alpha 2$ Globulin (Ceruloplasmine)	b. Antigens.
③. $\beta 1$ Globulin (Transferin)	c. Steroidal drugs, Thyroxin & Cyanocobalamine (Vit B12).
④. $\beta 2$ Globulin	d. Vitamin A, D, E, K.
⑤. γ Globulin	e. Carotinoids.

a. b,2-c,3-e,4-d,5-a
 b. 1-c,2-d,3-a,4-e,5-b
 c. 1-e,2-b,3-c,4-a,5-d
 d. d,2-a,3-b,4-c,5-e

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Level : B.Pharm.
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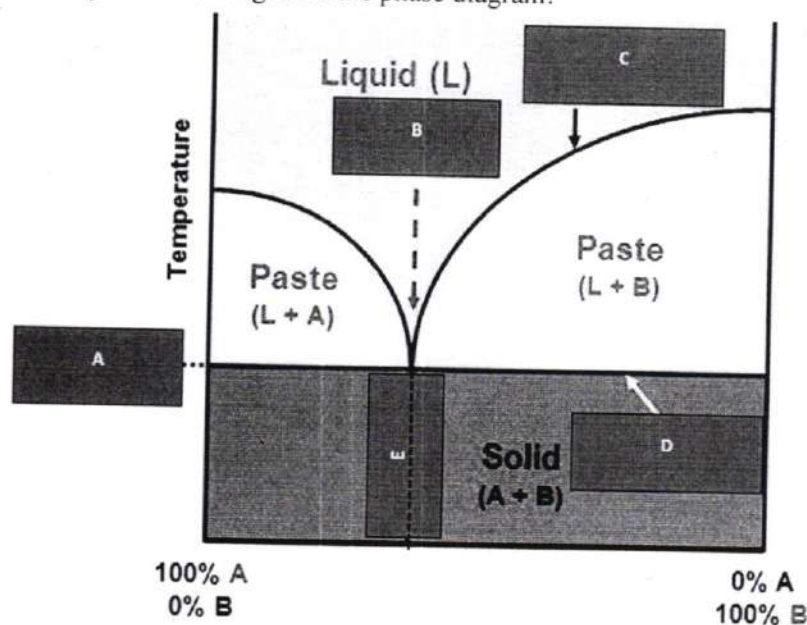
Course : PHAR 220
Semester : I
F. M. : 55

SECTION "B"

[5 Q. × 3 = 15 marks]

Attempt ANY FIVE questions.

1. Define:
 - a. Tyndall effect
 - b. Adsorption
 - c. Diffusion
2. How does the Michaelis-Menten equation explain a mixed-order reaction?
3. Describe the principle of any ONE method used to measure surface tension.
4. Identify the following from the phase diagram:



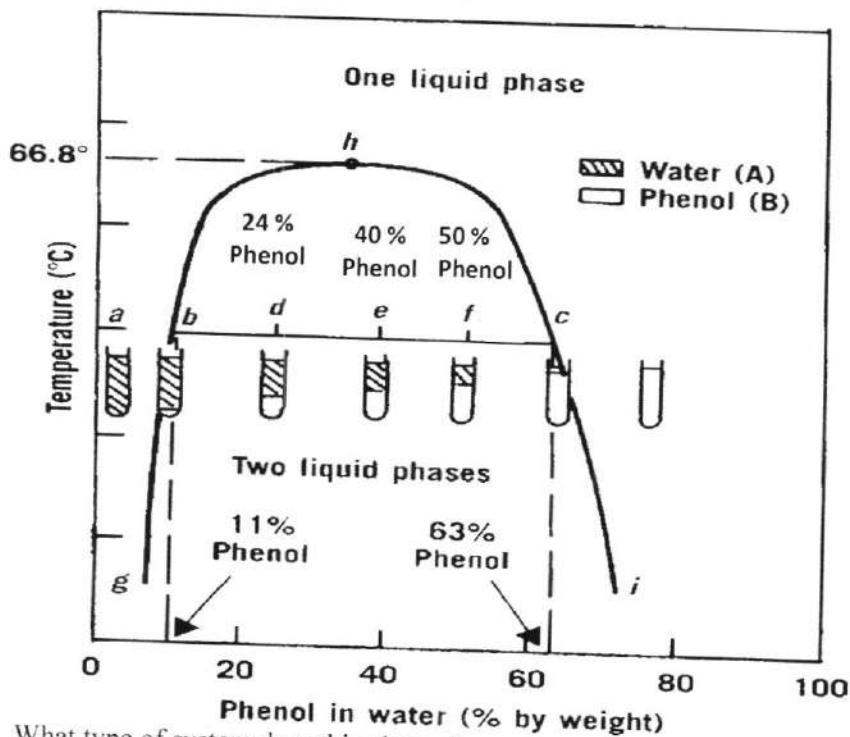
- a. What type of system does this phase diagram represent? [0.5]
- b. What do line A, B, C, D and E represent? [5×0.5=2.5]
5. Write a short note
 - a. The Debye-Huckel Theory
 - b. The *L Value*[2×1.5=3]
6. Define and classify complexes.
7. Draw schematic diagram of Starch-iodine complex.

P.T.O.

SECTION "C"
[5 Q. × 5 = 25 marks]

Attempt ANY FIVE questions.

8. Define colloids. Physical stability is the major problem in colloidal system. Discuss strategies to enhance the stability of colloidal systems.
9. Define Fick's law of diffusion. Explain how the Franz diffusion cell is used to measure diffusion rates.
10. Explain the effect of surfactants on surface tension. How does the Hydrophilic-Lipophilic Balance (HLB) assist in preparing emulsion dosage forms?
11. Many important drugs belong to the class of weak acids and bases. Their solubility is strongly influenced by the pH of solution.
 - a. Do you agree with this statement? [1]
 - b. Justify your decision. [4]
12. Identify the following from the phase diagram:



- a. What type of system does this phase diagram represent? [0.5]
- b. What is the significance of point H? [0.5]
- c. What does line BC represent? [0.5]
- d. What does curve GBHCI indicate? [0.5]
- e. Calculate the amounts of phenol and water required to create a 10 g mixture of phenol and water at points d, e, and f as indicated in the diagram above. [3×1=3]
13. Explain the mechanisms of protein drug binding and its application

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14. Draw the flow curve of the thixotropic materials. How can you measure the thixotropy exhibited by these materials.

SECTION "D"

[2 Q. × 7.5 = 15 marks]

Attempt ANY TWO questions.

15. What is a reaction constant? Differentiate between first order and pseudo-first order reactions. Explain how to estimate the shelf life (t_{90}) of drugs at storage temperatures using data from accelerated stability testing.
16. The flowability of Paracetamol granules is very poor during evaluation. The formulator seeks to improve the granules' flowability.
- Suggest different measurement techniques to the formulator along with criteria. [3.5]
 - Explain the various factors that affect the flowability of granules. [4]
17. Isotonic solutions are better tolerated by the patients and accepted for ophthalmic and parenteral administration.
- Explain the reasons for its acceptance. [1]
 - Suggested different measurement techniques of the tonicity of buffer solutions. [6.5]

