KATHMANDU UNIVERSITY
End Semester Examination
June/July, 2023

Marks Scored:

Level : B.Pharm.
Year : II

Course : PHAR 220
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date :

SECTION "A"
[20 Q. × 1 = 20 marks]

Encircle the correct option of the following multiple choice questions.

1. The first satisfactory theory of ionic solutions was that proposed by ..... in 1887.
   a. Arrhenius b. Kohlrausch c. Van't Hoff d. Thomsen

2. The.....is common method used for calculation of isotonic volume ophthalmic and parenteral solutions.
   a. White Vincent method b. Sprowl's method
   c. Cryoscopic method d. Sodium chloride equivalent method

3. 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}.
   a. 9.26 b. 7.89 c. 6.77 d. 5.55

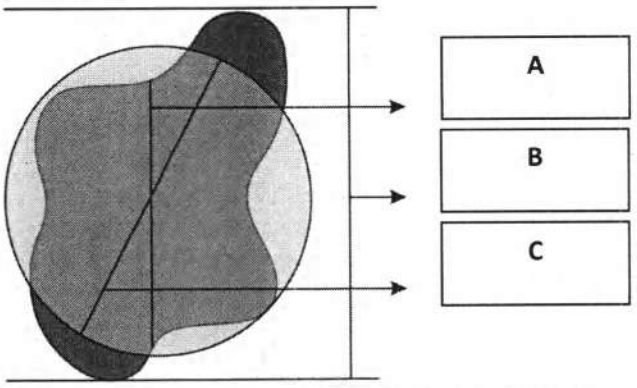
4. Which of the following statements relating to the formation of chelates is **TRUE**?
   a. Chelates are no bond complexes
   b. Chelation is the interaction between a metal ion and ethylene
   c. Chelation is the interaction between a metal ion and benzene
   d. Chelation is the interaction between a metal ion and a ligand

5. Which of the following statement relating to the protein binding of drug is **NOT TRUE**?
   a. Protein binding decreases the free drug concentration
   b. Protein binding to plasma albumin is a reversible process
   c. Prolongs the duration of action of a drug
   d. Protein bound drug is pharmacologically active

6. Solutions of suspending agents such as Tragacanth, Gelatin, carboxy methylcellulose and other water soluble mucilages and gums exhibit
   a. Newtonian flow b. Pseudoplastic flow
   c. Thixotropic flow d. Dilatant flow

7. For Newtonian flow, the slope of a rheogarm is
   a. Zero b. -1 c. 1 d. ½

8. Choose an appropriate equivalent diameter of asymmetric particle.



a. A: Feret's diameter B: Projected diameter C: Martin's diameter
b. A: Martin's diameter B: Feret's diameter C: Projected diameter
c. A: Feret's diameter B: Martin's diameter C: Projected diameter
d. A: Projected diameter B: Martin's diameter C: Feret's diameter

9. At a hydrogen ion concentration of 1.75×10^{-5} (pH= 4.76), what is the capacity of a buffer containing 0.10 mol each of acetic acid and sodium acetate per litre of solution? The total concentration, C = [acid] + [salt], is 0.20 mol/L, and the dissociation constant is 1.75×10^{-5}

a. 0.223 b. 0.115 c. 0.245 d. 0.145

10. A eutectic mixture is a mixture of
a. Two compounds with a density lower than those of either component
b. Two compounds with a sharp melting point lower than those of either component
c. Two compounds with a sharp melting point higher than those of either component
d. Two compounds with a sharp melting point equal to that of either component

11. For a zero-order degradation:
a. A plot of concentration versus time yields a straight line
b. A plot of the logarithm of concentration versus time yields a straight line
c. A plot of 1/concentration versus time yields a straight line
d. A plot of the concentration versus logarithm of time yields a curved line

12. According to ICH guidelines on stability testing what is the protocol for accelerated conditions for solid orals

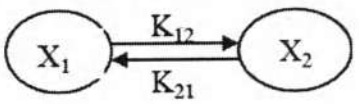
a. 40°C/65% relative humidity b. 30°C/65% relative humidity
c. 40°C/75% relative humidity d. 30°C/75% relative humidity

13. Radioactive decay follows a

a. Mixed-order rate b. Zero-order rate
c. First-order rate d. Second-order rate

14. An example of a pseudo-first-order reaction is one in which
a. The decomposition of a substance is shown by an increasing exponential curve
b. -d[A]/dt= -d[B]/dt
c. Either a or b is in excess
d. One in which all the reactants are used in order to form a product

15. ..... is the suitable differential equation for the following schematic reaction.



a. $-dX_1/dt = K_{21}.X_2 - K_{12}.X_1$
b. $-dX_1/dt = K_{21}.X_1 - K_{12}.X_2$
c. $-dX_1/dt = K_{21}.X_2 + K_{12}.X_1$
d. $-dX_1/dt = K_{21}.X_2 - K_{12}.X_1$

16. A surfactant with a very large Hydrophile-Lipophile Balance (HLB) value (e.g. 40) is expected to function as
a. Anti-foaming agent
b. Water in oil (w/o) emulsifier
c. Oil in water (o/w) emulsifier
d. Solubility enhancer

17. With which property of colloidal Tyndall effect is associated
a. Mechanical b. Colligative c. Optical d. Electrical

18. The Brownian motion is due to
a. Temperature fluctuation within the liquid phase
b. Attraction and repulsion between charges on the colloidal particles
c. Impact of the molecules of the dispersion medium on the colloidal particles
d. Convective currents

19. 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

20. Rate of dissolution can be expected to increase by
a. Increase in particle size
b. Decrease in surface area
c. unionized form of drug
d. Ionized form of drug

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26 JUN 2023

Level : B.Pharm.
Year : II
Time : 2 hrs. 30 mins.

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Semester : I
F. M. : 55

Note: Check (√) the number of each question of Section B, C and D you have answered in the front page of main answer book.

SECTION "B"

[5Q. × 3 = 15 marks]

Attempt *ANY **FIVE*** questions.

1. A cylindrical tablet of 10 mm diameter and 4 mm height weighed 480 mg and was made from the material of true density of 1.6 g cm^{-3}. Calculate porosity.

2. Give proper justification for the following. [3 × 1 = 3]
   a. Addition of glidant at low concentration improves the flow properties of granules, but high concentration of glidant decreases the flow properties of granules.
   b. Amorphous substances have greater solubility compared with crystalline counterparts.
   c. When pH is equal to pKa of the drug, that drug is 50% ionized.

3. Describe the Mechanisms of: [2 × 1.5 = 3]
   a. Protein drug binding
   b. Process of Solubilization (solute to solvent)

4. Write short notes on *ANY TWO* [2 × 1.5 = 3]
   a. Bulges and spurs
   b. Dynamic Dialysis
   c. Coulter counter technique

5. Predict the shelf-life of the drug that follows first order degradation and has half-life of 7 days.

6. Define surfactant. Explain about the cleansing action of surfactant.

7. The stability is a major problem for the colloidal system. What techniques can you apply to enhance their stability?

SECTION "C"

[5Q. × 5 = 25 marks]

Attempt *ANY FIVE* questions.

8. Distinguish between First order and Pseudo-First order reaction. If you need to determine order of reaction, how will you proceed?

9. What is surface tension? Write the steps of Capillary Rise Method to determine the surface tension of liquid. What are the problems that may encounter in this method?

10. Define Hydrophilic-lipophilic Balance (HLB) and mention its applications.

11. State the Fick's law of diffusion. Write on the types of diffusion process in our body.

12. Prepare a buffer solution of pH 5 having a capacity of 0.20 by choosing appropriate weak acid (Acetic acid, pKa = 4.76 or Phosphoric acid pKa=7.21) with justification.

13. When left to rest, non-Newtonian systems do slowly revert back to something close to their original form, BUT they do not have identical downward curves.
    a. What this phenomenon is called? [1]
    b. How this phenomenon is measured? [4]

14. Define different types of densities and methods used for their determination. Describe various parameters for the assessment of flow property of powders.

SECTION "D"
[2Q. × 7.5 = 15 marks]

Attempt *ANY TWO* questions.

15. A determination of the Stoichiometric ratio of ligand to metal and the stability constant for the complex formation are important in the study and application of complexes. Classify and describe the method use for analysis of these parameters.

16. Define colloidal dispersion. State it's any 3 examples. Mention the types of colloidal dispersion and describe the properties of colloids.

17. Define Diffusion and Dissolution. Explain the factors influencing the diffusion and dissolution of drugs. How can we perform diffusion as well as dissolution study in lab?