KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2019

Marks scored:

Level : B. Pharm.
Year : III
Course : PHAR 301
Semester : I

Exam Roll No. :
Time: 30 mins.
F. M. : 20

Registration No.:
Date FEB 27 2019

SECTION "A"
[20 Q × 1 = 20 marks]

I. Check (√) the correct answer of the following multiple choice questions:

1. Buffer capacity is maximum when pH= .....
   a. p^{ka} b. p^{kb} c. p^{kw} d. 1

2. What is the pH of a buffer solution containing 0.025 mol of ethanoic acid (p*K*a = 4.76) and 0.035 mol of sodium ethanoate in 1 litre of water?
   a. 6.14 b. 4.59 c. 4.89 d. 2.37

3. Indicate which of the following general statements is true:
   a. Acidic drugs are less soluble in alkaline solutions than in acidic solutions.
   b. Basic drugs are more soluble in alkaline solutions than in acid solutions.
   c. The zwitterion of an amphoteric drug has a higher solubility than the acidic or basic forms of the drug.
   d. The effective net charge on the zwitterion is zero at the isoelectric point.

4. Activity coefficient of ideal solution is.....
   a. 1 b. 0 c. >1 d. < 1

5. Codeine phosphate is the salt of a
   a. Weak acid and a weak base
   b. Weak base and a weak acid
   c. Strong acid and weak base
   d. Strong base and weak base

6. The time taken for 5% of a drug to decompose by first-order kinetics is:
   a. 0.022/*k*1 b. 0.051/*k*1 c. 0.105/*k*1 d. *k*1/0.051

7. Indicate which of the following statement relating to the protein binding of drugs are true:
   a. Protein binding to plasma albumin is an irreversible process.
   b. Protein binding decreases the free drug concentration.
   c. Drugs with a low lipophilicity have a high degree of protein binding.
   d. Protein binding of antibiotics usually increases antibiotic action.

8. Indicate which of the following drugs are salts of a weak acid and strong base:
   a. chlorpromazine hydrochloride
   b. sodium salicylate
   c. acetylsalicylic acid
   d. chlorpheniramine maleate

9. Indicate which of the following molecular characteristics will be expected to increase the solubility of a simple solute in an aqueous solution:
   a. a low melting point
   b. a high molecular surface area
   c. the presence of non- ionised group
   d. a high boiling point

10. Maximum buffer capacity, βmax, = ...
a. 0.576Co b. 0.693/k c. 2.303Co d. 765Co

11. The contact angle forming between magnesium stearate and water is larger than that between lactose and water because:
a. Magnesium stearate is more hydrophilic
b. Magnesium stearate is more hydrophobic
c. Lactose has more surface energy
d. None of the above

12. What is the main result of adding surfactants into a liquid composed of two immiscible phases such as oil and water?
a. Reduction in interfacial tension between the phases
b. Increase in interfacial tension between the phases
c. Catalysation of chemical reaction between the phases
d. None of the above

13. Measuring zeta potential is useful in determining which property of a liquid formulation?
a. Viscosity b. Stability c. Particle size d. Solubility

14. The scattering of light by colloidal dispersed systems is known as
a. DLVO theory b. Donnan membrane effect
c. Tyndall effect d. Stokes law

15. Which of the following is the correct statement regarding pseudoplastic liquid?
a. A liquid which becomes less viscous as the rate of shear increases.
b. A liquid that becomes less viscous over time when a constant shear stress is applied.
c. A liquid which becomes more viscous as the rate of shear increases.
d. A liquid that becomes more viscous over time when a constant shear stress is applied.

16. Type of flow in which viscosity increases when the substance is agitated is:
a. Plastic b. Pseudoplastic
c. Dilatant d. Negative thixotropy

17. Andreasen apparatus works under the principle of
a. Sieving b. Stoke's law c. Sedimentation d. Both b and c

18. When the frequency index, f has the value of 0, then the size distribution expressed as:
a. Length b. Surface c. Volume d. Number

19. If the system can exchange energy, but not mass with its surroundings, we call it as
a. Open system b. Isolated system
c. Conserved system d. Closed system

20. Degree of freedom for a non-condensed system containing two components but only one phase is:
a. 1 b. 2 c. 3 d. 4

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Note: Check (√) the number of each question you have answered of Section B, C and D in the front page of main answer book. Be specific while answering each question; unnecessary writing will deduct your marks.

SECTION "B"

[5 Q. × 3 = 15 marks]

II. Answer *ANY FIVE* questions:

1. Write down Henderson Hasselbach equation for weak acid and weak base and its salts with its application.

2. Define "Common ion effect", "saturated solution" and "amphoteric drug".

3. What is the pH of a solution of ascorbic acid (pKa= 4.17) of concentration 0.284 mol dm^{-3}?

4. Write short notes on bulges and spurs with appropriate illustrations.

5. What is meant by HLB and RHLB? Calculate the HLB of mixture of 40% of Span 60 and 60% of Tween 60. (HLB of Span 60 is 4.7 and that of Tween 60 is 14.9)

6. What are pharmaceutical applications of micromeritics?

7. Write short notes on: (*ANY THREE*)
   a. Kinematic viscosity
   b. Angle of repose
   c. Packing arrangement
   d. Rheopexy

SECTION "C"

[5 Q. × 5 = 25 marks]

III. Answer *ANY FIVE* questions:

8. Why 'order of reactions are important to determine for pharmacist? Water has dielectric constant 78 at room temperature. What does this mean to you?

9. Define 'Chelation'. Give any two examples of chelation.

10. Dicloxacillin, which is 95% bound to protein, is and ampicillin, which is only bound to the extent of 20%. What does this data mean to you?

11. What is necessary to know to calculate the shelf-life? Explain the application of Arrhenius equation in drug stability.

12. Explain the DuNouy ring method for the measurement of surface and interfacial tension.

13. How can you improve the physical stability of lyophobic colloids? Explain with the help of DLVO theory.

14. Explain in detail about the sedimentation technique for the particle size determination.

SECTION "D"

[2 Q. × 7.5 = 15 marks]

III. Answer *ANY TWO* questions:

15. Describe step by step how you determine expiry date of a pharmaceutical product.

16. How many grams of sodium chloride should be added to 25 ml of a 1% solution of tetracaine hydrochloride to make the solution isotonic? The freezing-point depression of 1% tetracaine hydrochloride is 0.109°C, the freezing-point depression of 1% NaCl is 0.576°C and the freezing point of blood serum is –0.52°C.

17. What are the different types of viscometers used to determine the viscosity of different systems? Explain in detail about any one viscometer used to determine viscosity of a Non-Newtonian fluid.