

Al-Azhar University of Gaza

College of Pharmacy

Pharmaceutics and Pharmaceutical Technology Department

Physical Pharmacy I

Final Exam- June 2013

Physical pharmacy I
dr hend
final 2013

Name of Student (باللغة العربية):

Student ID:

الرجاء عدم استعمال القلم الأحمر أو الرصاص في إجابة الأسئلة

Question	Mark
Q ₁	
Q ₃	
Q ₄	
Total (50 M)	
Q ₂ (10 M)	

لاستعمال المدرس فقط:

Mid Term Exam Mark (40 M):

Total Mid Term Exam (50 M):

Total Mark (100 M):

Q1: Please choose the one option - (A), (B), (C), or (D) - that correctly completes the sentences:

Answers of MCQ:

البي إجابة خارج نطاق الجدول

1	2	3	4	5	6	7	8	9
11	12	13	14	15	16	17	18	19
21	22	23	24	25				

- The effective concentration can be related to the stoichiometric concentration using
 - Ionic strength.
 - Activity coefficient.
 - Degree of dissociation.
 - All of the above is correct.
- The mean ionic activity of 0.02 M solution of Na_2SO_4 ..
 - $0.218 \gamma_{\pm}$.
 - $0.032 \gamma_{\pm}$.
 - $4 \times 10^{-6} \gamma_{\pm}$.
 - $1.03 \times 10^{-6} \gamma_{\pm}$.
- Comparing the osmotic pressure of (2: 1) electrolytic drug (π_2) with that of non-electrolyte (π_1)..
 - $\pi_2 = \pi_1$
 - $\pi_2 = 2 \pi_1$
 - $\pi_2 = 3 \pi_1$
 - $\pi_2 = 4 \pi_1$
- The ionic drugs behave in concentrated solutions as..
 - Fully associated.
 - Fully dissociated.
 - Partially dissociated.
 - Fully independent ions.
- The Van't Hoff factor (i) in case of an aqueous solution of morphine sulfate (a 1:1 electrolyte) equals to..
 - 1
 - 2
 - 3
 - 4

6. In a dilute solution of Na_2SO_4 , the proportionality constant relates the activity to the stoichiometric concentration is equal to.
- 0
 - 1
 - 2
 - 3
7. The ratio between the observed boiling point, to that the solution would exhibit if the solutes were non electrolytes is called.
- Ionic strength (μ)
 - Van't Hoff factor (i)
 - Activity coefficient (γ)
 - Degree of dissociation (α)
8. Ionic strength represents.
- The mean ionic activity of an electrolyte
 - The degree of association of an electrolyte
 - The contribution to the electrostatic forces of the ions of all types
 - A correction factor to account for the irregular behavior of ionic compounds
9. "Strong electrolytes are completely ionized in dilute solutions and any deviation of from 100% ionization is due to the electrostatic attraction of the oppositely charged ions". This is the principles of.
- Arrhenius theory.
 - Ionic strength theory.
 - Debye and Hückel theory.
 - Degree of dissociation theory.
10. The tonicity of solutions can be measured, using one of these methods except.
- Hemolytic method
 - L_{90} - based method
 - Potentiometric method.
 - Colligative properties method
11. A familiar pharmaceutical isotonic solution.
- 0.9 w/v % NaCl solution.
 - 4.0 w/v % glucose solution.
 - 3.0 w/v % dextrose solution.
 - 2.0 w/v % ascorbic acid solution.
12. Calculate the volume of water required, to be added to the drug to make an isotonic solution, followed by the addition of an isotonic solution to bring the solution to the final volume.
- Sprows method
 - Cryoscopic method
 - White- Vincent method
 - NaCl- equivalent method.
13. The following equation can be used to calculate the E- value of a drug.
- $E = \Delta T_f / L_{90}$
 - $E = (17 \times M) / L_{90}$
 - $E = (17 \times L_{90}) / M$
 - $E = W \times V \times 111.1$

14. Hypotonic solutions are characterized by the following except..
- Cause inward movement of water to the RBCs.
 - When being applied to blood, the RBCs will swell.
 - When being applied to blood, the RBCs will shrink.
 - Lower osmotic pressure than 0.9% w/v NaCl solution.
15. If 1-10 parts of the solvent are required to dissolve 1 part of a drug, the drug so can be described as..
- Very soluble.
 - Freely soluble.
 - Sparingly soluble.
 - Practically insoluble.
16. There is an increase in the solubility in case of..
- Real solutions with positive deviation from Raoult's law.
 - Ideal solutions with positive deviation from Raoult's law.
 - Real solutions with negative deviation from Raoult's law.
 - Ideal solutions with negative deviation from Raoult's law.
17. The factors affecting solubility of solids in liquids include the following except..
- Pressure effect.
 - Surfactant effect.
 - Polarity of the solvent.
 - Symmetry of particles.
18. The volume of gas in liters (reduced to STP) that dissolves in one liter of solvent at partial pressure of atmosphere of the gas at a definite temperature is called..
- Bunsen coefficient (α).
 - Solubility coefficient (δ).
 - Henry's law constant (K).
 - Inverse of Henry's law constant ($1/K$).
19. When gases are liberated from solutions if sodium chloride or sucrose is added, this
- Blending
 - Salting out.
 - Cosolvancy.
 - Micellar solubilization.
20. The addition of sodium oleate to phenol- water system..
- Lowers the LCST.
 - Lowers the UCST.
 - Increases the UCST.
 - Not affecting either LCST or UCST.
21. Example for the intermediate solvents..
- Castor oil.
 - Ethylene glycol.
 - Methyl salicylate.
 - Benzyl benzoate.

- 22 The best preservative in oil/water systems.
- Completely ionized.
 - With high partition coefficient.
 - Concentrate in aqueous phase.
 - With high acid dissociation constant.
- 23 When a solution contains more of the dissolved solute than it would normally contain at a certain temperature.
- Saturated solution.
 - Unsaturated solution.
 - Subsaturated solution.
 - Supersaturated solution.
- 24 Molar refraction is related to..
- Dipole moment and the molecular properties of the compound.
 - Refractive index and the molecular properties of the compound.
 - Dielectric constant and the molecular properties of the compound.
 - Induced polarizability and the molecular properties of the compound.
- 25 Have different stabilities and solubilities although they are chemically identical.
- Polymorphs.
 - Enantiomers.
 - Stereoisomers.
 - Amorphous solids.

Q2: Please choose the one option - (A), (B), (C) or (D) - that correctly completes the sentences: (10M)

Answers of MCQ:

لا يظن لأي إجابة خارج نطاق الجدول

1	2	3	4	5	6	7	8	9	10

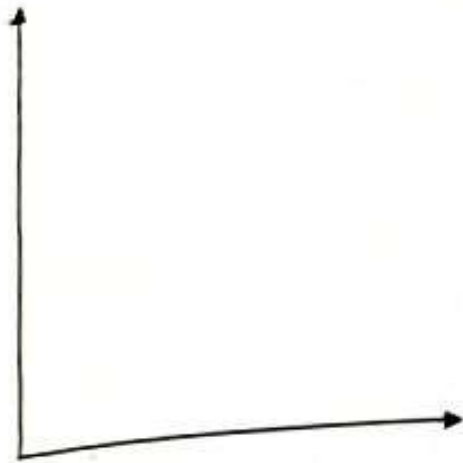
- Sterile water for injection USP is characterized by the following except..
 - Purified water.
 - Required to be sterile.
 - Not required to be pyrogen free.
 - Used for reconstitution of multiple antibiotics.
- Fever producing organic substances arising from bacterial contamination..
 - Pyrogen.
 - Colorants.
 - Preservatives.
 - Flavoring agents.
- With heat labile substances all of the following techniques can be used except.
 - The use of heat.
 - The use of agitation.
 - The use of a solubilizer.
 - The use of fine powders.

4. Concentrated preparations of vegetable or animal drugs, their consistency depends on the degree of evaporation of the solvent.
- Elixirs
 - Syrups
 - Extracts
 - Tinctures
5. The component of an Elixir which acts as a preservative.
- Alcohol
 - Butyl paraben
 - Sodium benzoate
 - Benzalkonium chloride
6. Most syrups contain.
- 20-25% sucrose
 - 40-60% sucrose
 - 60-85% sucrose
 - More than 90% sucrose
7. Excessive heat should be avoided in the preparation of syrups to prevent.
- The change in color
 - The change in sweetness
 - The formation of invert sugar
 - All of the above is correct
8. Liquid preparations containing pyroxylin dissolved in a mixture of alcohol and ether are used only externally.
- Syrups
 - Tinctures
 - Liniments
 - Collodions
9. Clear syrupy liquid with sweet taste, viscous, miscible with water and alcohol.
- Glycerin
 - Purified water
 - Coloring agent
 - Ethylene glycol
10. Dry powders for reconstitution can be used in case of.
- Insufficiently stable drugs in air
 - Insufficiently stable drugs in aqueous solution
 - Formulas contain all of the components including the solvent
 - Formulas that can be stored in a refrigerator more than one month after reconstitution

Q3: Please draw the following relationships:

(5M)

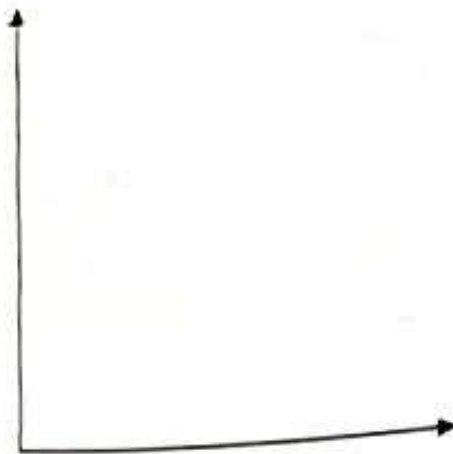
1. Ideal mole fraction solubility - temperature of a solid in liquid.
2. Freezing point depression of an electrolytic solution and the Van't Hoff factor.
3. Effect of addition of NaCl on triethylamine-water system.
4. Vapor pressure-composition curve for an ideal-binary system.
5. The activity of the solvent (a_1) and the vapor pressure of the solvent (P_1).



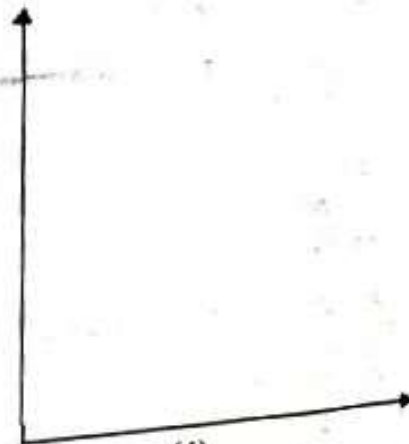
(1)



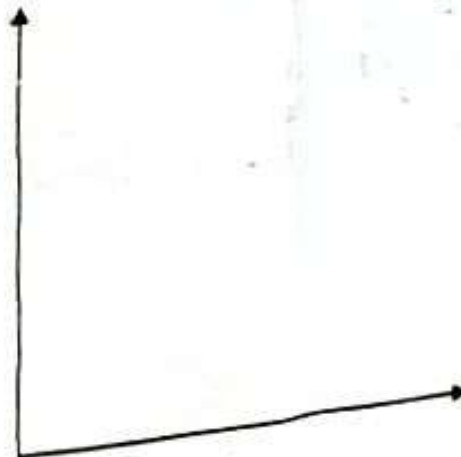
(2)



(3)



(4)



(5)

2. A 200 ml solution contains 2% of cocaine hydrochloride ($M = 339.81 \text{ g/mol}$).

a) Show if this solution is isotonic or not ($i_m = 3.2$).

b) How many grams of NaCl must be added to make the solution isotonic?

($E_{\text{drug}} = 0.16$).

(5M)

Q4: Problems:

1. Calculate the mean ionic activity coefficient of 0.02 M solution of Sodium chloride (1:1 electrolyte) mixed with 0.1 M calcium chloride?
(A factor = 0.51).

4. What is the solubility of caffeine at 25°C in an ideal solution? The melting point of caffeine is 228°C and the molar heat of fusion is 5044 cal/mole.
($R = 1.9872 \text{ cal. deg}^{-1} \cdot \text{mol}^{-1}$).

(5M)

Good luck
Dr. Paul M. Allen

3. What is the osmotic pressure (atm) of a 3.0 m solution of Ephedrine sulfate solution at 25°C. The (i) factor for 3.0 m solution of Ephedrine sulfate is 4.3.
($R = 0.0821 \text{ atm.L.deg}^{-1}.\text{mol}^{-1}$)