

Unit 7 Chemistry Take-Home Exam - Chapters 16 & 19

All answers need to be written on the Answer Sheet!! (Last page of Exam)

Matching

Match each item with the correct statement below (Questions #1-5)

- | | |
|----------------------------|------------------------------|
| a. boiling point elevation | d. molarity |
| b. molality | e. freezing point depression |
| c. solubility | |
- number of moles of solute dissolved in 1 L of solution
 - a colligative property related to the fact that ice will form at higher temperatures in the Great Lakes than in the ocean
 - a colligative property related to a decrease in the vapor pressure of a solution
 - number of moles of solute dissolved in 1 kg of solvent
 - the amount of solute that dissolves in a given quantity of solvent at a specified temperature and pressure

Match each item with the correct statement below (Questions #6-10)

- | | |
|--------------------------|--------------|
| a. hydrogen-ion donor | d. titration |
| b. hydrogen-ion acceptor | e. buffer |
| c. amphoteric | |
- substance that can act as an acid or a base
 - substance that resists change in pH
 - Brønsted-Lowry acid
 - process of adding a known amount of solution of known concentration to determine the concentration of another solution
 - Brønsted-Lowry base

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- Which of the following is primarily responsible for holding water molecules together in the liquid state?

a. dispersion forces	c. ionic bonding
b. hydrogen bonding	d. covalent bonding
- What is the term for the *dissolving medium* in a solution?

a. solvent	c. solvator
b. solute	d. emulsifier
- 10 mL of vinegar is added to 100 mL of water. The vinegar is classified as the _____.

a. solvent	c. solvator
b. solute	d. emulsifier
- Which of these substances will *dissolve* in water?

a. CH ₄ , Methane gas	c. C ₃ H ₈ , Propane gas
b. Baby oil	d. KCl
- A solution is a mixture _____.

a. from which the solute can be filtered
b. that has the same properties throughout
c. that is heterogeneous
d. in which a solid solute is always dissolved in a liquid solvent

16. Which of the following compounds is an electrolyte?
- rubbing alcohol
 - sugar
 - methane
 - sodium chloride
17. A crystal that absorbs water vapor from the air is ____.
- aqueous
 - deliquescent
 - hygroscopic
 - efflorescent
18. Which of the following mixture types is characterized by the *settling of particles*?
- solution
 - suspension
 - colloid
 - hydrate
19. Which of the following types of mixtures exhibit the *Tyndall effect*?
- solutions
 - suspensions
 - colloids
 - none of the above
20. Which of the following mixtures is NOT a colloid?
- fog
 - milk
 - paint
 - sugar water
21. Which of these statements is correct?
- Particles can be filtered from a suspension.
 - A solution is heterogeneous.
 - A colloidal system does not exhibit the Tyndall effect.
 - The particles in a colloidal system are affected by gravity.
22. Which of the following usually makes a substance dissolve faster in a solvent?
- agitating the solution
 - increasing the particle size of the solute
 - lowering the temperature
 - decreasing the number of particles
23. Which of the following WILL NOT increase the solubility of CO₂ gas?
- increase pressure
 - increase temperature
 - decrease temperature
 - increase [CO₂]
24. Which of the following substances is less soluble in hot water than in cold water?
- CO(g)
 - NaCl (s)
 - NaNO₃ (s)
 - KBr (s)
25. What is the molarity of a solution that contains 6 moles of solute in 2 liters of solution?
- 6M
 - 12M
 - 7M
 - 3M
26. What is the molarity of a solution containing 56 grams of solute in 959 mL of solution? (molar mass of solute = 26 g/mol)
- 1.5M
 - 2.2M
 - 2.1M
 - 0.0022M
27. The volume of 6.00M HCl needed to make 319 mL of 6.80M HCl is ____.
- 0.128 mL
 - 7.8 mL
 - 281 mL
 - 362 mL
28. The molality of a solution containing 8.1 moles of solute in 4847 g of solvent is ____.
- 39m
 - 1.7m
 - 0.17m
 - 598m

29. What is the molality of a solution containing 8.0 grams of solute in 0.50 kg of solvent? (molar mass of solute = 24 g)
- $0.67m$
 - $4m$
 - $1.67m$
 - $0.17m$
30. The freezing point of a solution that contains 0.550 moles of NaI in 615 g of water is _____. ($K = 1.86C/m$)
- $1.66C$
 - $-1.66C$
 - $3.33C$
 - $-3.33C$
31. What is the boiling point of a solution that contains 3 moles of KBr in 2000 g of water? ($K = 0.512C/m$; molar mass of water = 18 g)
- $97C$
 - $99.7C$
 - $101.4C$
 - $103C$
32. Four students made ice cream in Chemistry class. The following data from each student was obtained:
 Student A - 50 g NaCl and 500 g H_2O
 Student B - 80 g NaCl and 600 g H_2O
 Student C - 60 g NaCl and 600 g H_2O
 Student D - 75 g NaCl and 800 g H_2O
 Which student's ice cream froze first due to the lower temperature?
- Student A
 - Student B
 - Student C
 - Student D
33. Which of the following is a property of an *acid*?
- sour taste
 - nonelectrolyte
 - strong color
 - unreactive
34. What is a property of a *base*?
- bitter taste
 - watery feel
 - strong color
 - unreactive
35. What is the formula for phosphoric acid?
- H_2PO_3
 - H_3PO_4
 - HPO_2
 - HPO_4
36. When an acid reacts with a base, what compounds are formed?
- a salt only
 - water only
 - metal oxides only
 - a salt and water
37. If the hydrogen ion concentration of a solution is $1 \times 10^{-4}M$, is the solution acidic, basic, or neutral?
- acidic
 - basic
 - neutral
 - The answer cannot be determined.
38. Which of these solutions is the most *basic*?
- $[H] = 1 \times 10^{-4}M$
 - $[OH] = 1 \times 10^{-4}M$
 - $[H] = 1 \times 10^{-6}M$
 - $[OH] = 1 \times 10^{-6}M$
39. What characterizes a *strong acid or base*?
- polar covalent bonding
 - complete ionization in water
 - ionic bonding
 - presence of a hydroxide or hydrogen ion
40. Suzie accidentally spilled a chemical that contained $2.5 \times 10^{-3}M$ of $[OH^-]$. What type of chemical did she drop?
- Acid
 - Base
 - Neutral Solution
 - Water