

AP Chem Chapter 11: TEST

- 1) How many milliliters of 15.7 M H_2SO_4 are needed to prepare 600.0 mL of 0.10 M H_2SO_4 ?
- A) 0.26 mL
 - B) 94 mL
 - C) 3.8 mL
 - D) 1.9 mL
 - E) 4.8 mL
- 2) Determine the Molarity of a solution containing 6.76 g $BaCl_2$ in 750.0 mL of solution.
- A) $3.25 \times 10^{-2} M$
 - B) $2.44 \times 10^{-2} M$
 - C) $9.01 \times 10^{-3} M$
 - D) $4.33 \times 10^{-2} M$
 - E) 9.01 M
- 3) Calculate the molality of C_2H_5OH in a water solution that is prepared by mixing 50.0 mL of C_2H_5OH with 112.7 mL of H_2O at $20^\circ C$. The density of the C_2H_5OH is 0.789 g/mL at $20^\circ C$. (Assume the density of water at this temperature is 1.00 g/mL.)
- A) 0.00963 m
 - B) 0.155 m
 - C) 0.132 m
 - D) 7.60 m
 - E) 9.63 m
- 4) What is the molality of a solution of 30.1 g of propanol ($CH_3CH_2CH_2OH$) in 152 mL water, if the density of water is 1.00 g/mL?
- A) 3.29 m
 - B) 0.00330 m
 - C) 0.303 m
 - D) 0.501 m
 - E) 5.01 m
- 5) A 3.140 molal solution of $NaCl$ is prepared. How many grams of $NaCl$ are present in a sample containing 2.314 kg of water?
- A) 726.6 g
 - B) 124.3 g
 - C) 257.6 g
 - D) 424.6 g
 - E) none of these
- 6) If 2.00 g of helium gas and 3.82 g of oxygen gas are mixed together, what is the mole fraction of helium in the solution?
- A) 0.344
 - B) 0.193
 - C) 0.807
 - D) 0.119
 - E) 1.24

- 7) What is the molarity of a HNO_3 solution prepared by adding 255.4 mL of water to 350.0 mL of 12.3 M HNO_3 ?
- A) 16.9 M
 - B) 7.45 M
 - C) 7.11 M
 - D) 2.61 M
 - E) 3.14 M
- 8) When a 49.1-g sample of an unknown compound is dissolved in 500.g of benzene, the freezing point of the resulting solution is 3.77°C . The freezing point of pure benzene is 5.48°C and K_f for benzene is $5.12^\circ\text{C}/\text{m}$. Calculate the molar mass of the unknown compound.
- A) 147 g/mol
 - B) 28.7 g/mol
 - C) 251 g/mol
 - D) 588 g/mol
 - E) 294 g/mol
- 9) Determine the change in boiling point for 397.7 g of carbon disulfide ($K_b = 2.34^\circ\text{C kg}/\text{mol}$) if 35.0 g of a nonvolatile, nonionizing compound is dissolved in it. The molar mass of the compound is 70.0 g/mol and the boiling point of the pure carbon disulfide is 46.2°C .
- A) 0.206°C
 - B) 1.86°C
 - C) 5.88°C
 - D) 24.8°C
 - E) 2.94°C
- 10) A cucumber is placed in a concentrated salt solution. What will most likely happen?
- A) Water will flow from the cucumber to the solution.
 - B) Water will flow from the solution to the cucumber.
 - C) Salt will flow into the cucumber.
 - D) Salt will precipitate out.
 - E) No change will occur.
- 11) Consider pure water separated from an aqueous sugar solution by a semipermeable membrane, which allows water to pass freely but not sugar. After some time has passed, the concentration of sugar solution:
- A) will have increased
 - B) will have decreased
 - C) will not have changed
 - D) might have increased or decreased depending on other factors
 - E) will be the same on both sides of the membrane

- 12) What is reverse osmosis?
- A) the application, to a concentrated solution, of a pressure that is greater than the osmotic pressure, such that solvent flows from the concentrated solution to the dilute solution
 - B) the application, to a dilute solution, of a pressure that is greater than the osmotic pressure, such that solvent flows from the concentrated solution to the dilute solution
 - C) the application, to a concentrated solution, of a pressure that is greater than the osmotic pressure, such that solute flows from the concentrated solution to the dilute solution
 - D) the application, to a dilute solution, of a pressure that is greater than the osmotic pressure, such that solute flows from the concentrated solution to the dilute solution
 - E) the application, to a concentrated solution, of a pressure that is greater than the osmotic pressure, such that solvent flows from the dilute solution to the concentrated solution
- 13) What is the freezing point of an aqueous 1.58 molal NaCl solution? ($K_f = 1.86^\circ\text{C}/m$)
- A) -2.94°C
 - B) 2.94°C
 - C) -5.88°C
 - D) 5.88°C
 - E) 0.00°C
- 14) A salt solution sits in an open beaker. Assuming constant temperature and pressure, the vapor pressure of the solution
- A) increases over time
 - B) decreases over time
 - C) stays the same over time
 - D) need to know which salt is in the solution to answer this
 - E) need to know the temperature and pressure to answer this
- 15) What is the expected boiling point of a solution prepared by dissolving 7.27 g of sodium iodide (NaI) in 68.6 g of water (H_2O)? For water, $T_b = 100.00^\circ\text{C}$ and $K_b = 0.512^\circ\text{C } m^{-1}$.
- A) 0.72°C
 - B) 100.36°C
 - C) 103.72°C
 - D) 100.72°C
 - E) 0.36°C
- 16) A solution is made by dissolving 27.8 g of nicotine (molar mass = 160 g/mol) in 145 g of cyclohexane (C_6H_{12}) to form 142 mL of solution. Calculate the mole fraction of the solute and the molarity, respectively, of this solution.
- A) 0.174, 1.22 M
 - B) 0.101, 12.1 M
 - C) 0.101, 1.22 M
 - D) 0.091, 1.22 M
 - E) 0.174, 12.1 M

17) Which of the following aqueous solutions will have the LOWEST vapor pressure?

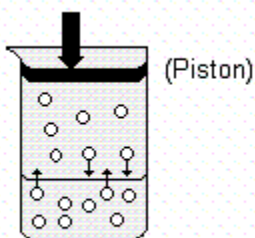
- A) 0.20 m $C_6H_{12}O_6$
- B) 0.20 m NaCl
- C) 0.10 m $CaCl_2$
- D) 0.40 m C_2H_5OH
- E) 0.20 m Na_2SO_4

18) Which of these solutions 0.1 m NaCl, 0.15 m glucose, 0.1 m $CaCl_2$ would have

- I. the highest vapor pressure
- II. the lowest boiling point

- A) 0.1 m $CaCl_2$, 0.1 m $CaCl_2$
- B) 0.15 m glucose, 0.1 m $CaCl_2$
- C) 0.1 m $CaCl_2$, 0.15 m glucose
- D) 0.15 m glucose, 0.15 m glucose
- E) 0.1 m NaCl, 0.1 m $CaCl_2$

19) Use the following drawing of a gaseous solute in equilibrium with a solution to help answer the question below.



Which of the following statements are true when the piston is pushed in (downward)?

- A) This will cause the pressure of the gas to increase and the concentration of the dissolved gas to go down.
- B) This will cause the pressure of the gas to decrease and the concentration of the dissolved gas to go down.
- C) This will cause the pressure of the gas to increase and the concentration of the dissolved gas to go up.
- D) This will cause the volume of the gas to decrease and the concentration of the dissolved gas to go down.
- E) This will cause the volume of the gas to increase and the concentration of the dissolved gas to go up.

20) Which compound has a Van't Hoff factor of 3.0

- a) Sodium Nitrate
- b) Ammonium Sulfide
- c) Potassium Phosphate
- d) Nickel (II) Carbonate
- e) Glucose

Go Vikings!!