Self Assessment A

Question 1

Which of the following compounds would be most likely to dissolve in CCl_4?

- **A)** I_2
- **B)** H_2O
- **C)** C_8H_{18}
- **D)** Compounds A and C
- **E)** Compounds B and C

Question 2

The most significant forces between solute and solvent in an aqueous ethyl alcohol (CH_3CH_2OH) solution are:

- **A)** charge-charge interactions
- **B)** charge-dipole interactions
- **C)** dispersion forces
- **D)** hydrogen bonding

Question 3

What is the molality of a solution composed of 38.0 g of cane sugar ($C_{12}H_{22}O_{11}$) dissolved in 175 g of water?

- **A)** 0.514 mol/kg
- **B)** 635.0 mol/kg
- **C)** 0.217 mol/kg
- **D)** 0.635 mol/kg
- **E)** 217 mol/kg

Question 4

A sample of rubbing alcohol contains 142.0 g of isopropanol (C_3H_7OH) and 58.0 g of water. The mole fractions of alcohol and water are

- **A)** 2.36 and 3.22
- **B)** 0.423 and 0.577
- **C)** 0.236 and 0.322
- **D)** 0.577 and 0.423
- **E)** 0.733 and 1.324

Question 5

The solubility of a gas in water generally _____ with increasing pressure.

- **A)** increases
- **B)** decreases
- **C)** remains the same
- **D)** In order to answer the question, one must know the identity of the gas in question.

Question 6

The vapor pressure of pure water at 26°C is 25.21 torr. What is the vapor pressure of a solution that contains 16.0 g of glucose ($C_6H_{12}O_6$) dissolved in 80 g of water?

- **A)** 16.8 torr
- **B)** 24.7 torr
- **C)** 0.49 torr
- **D)** 25.4 torr
- **E)** 14.1 torr

Question 7

Calculate the approximate freezing point of a solution prepared by dissolving 10.0 g of naphthalene ($C_{10}H_8$) in 300 g of cyclohexane. Pure cyclohexane freezes at 6.6°C. K_f of cyclohexane = 20.0°C/m.

- **A)** 5.21
- **B)** -1.39
- **C)** 11.8
- **D)** 1.39
- **E)** None of the above

Question 8

What would be the osmotic pressure at 65°C of an aqueous solution containing 2.50 g of sucrose ($C_{12}H_{22}O_{11}$) per 205 mL of solution?

- **A)** 0.989 atm
- **B)** 0.192 atm
- **C)** 0.812 atm
- **D)** 0.338 atm
- **E)** 1.450 atm

Question 9

The freezing point of a solution prepared by dissolving 17.0 g of KCl in 150 g of water is -4.70 °C. Calculate the van't Hoff factor, i, for this solution. K_f for water = 1.86°C/m.

- **A)** 1.86
- **B)** 2.52
- **C)** 1.66
- **D)** 1.52

- **E)** None of the above

Question 10

_____ colloids are solutions containing extremely large molecules such as proteins. These colloids are also termed "water loving".

- **A)** hydrophobic
- **B)** aerosol
- **C)** hydrophilic
- **D)** emulsion
- **E)** solid sol

Question 11

Calculate the molar concentration of 50.0g KNO_3 dissolved in 1.50 liters of solution.

- **A)** 1.330 M
- **B)** 0.330 M
- **C)** 0.660 M
- **D)** 1.160 M

Question 12

Which of the following is incorrectly paired?

- **A)** Aerosol; a gas dispersed within a liquid.
- **B)** Emulsion; liquid dispersed within another liquid.
- **C)** Sol; solid particles in liquid.
- **D)** Foam; liquid within a gas.

Question 13

A hydrophilic colloid must generally be stabilized.

- **A)** True
- **B)** False

Question 14

Osmosis refers to the selective passage of solvent molecules

- **A)** through a porous membrane regardless of concentration.
- **B)** between solutions of equal concentration.
- **C)** from a dilute solution to a more concentrated solution.
- **D)** from a concentrated solution to a more dilute solution.

Question 15

What is the osmotic pressure of 0.010 M $C_{12}H_{22}O_{11}$ at 20^0C ?

- **A)** 0.10 atm
- **B)** 0.24 atm
- **C)** 0.50 atm
- **D)** 0.75 atm