States of matter and solutions test answers

1. C 2) B 3) C 4) D 5) A 6) A 7) B 8) C 9) B 10) B 11) A 12) A 13) B 14) D 15) D 16) D 17) B 18) C 19) E 20) C 21) D 22) E 23) D 24) C 25) B 26) B 27) A 28) B 29) B 30) D 31) C 32) A 33) E 34) C 35) B 36) E 37) D 38) D 39) A 40) C 41) B 42) E 43) C 44) C 45) C 46) A 47) D 48) A 49) C 50) B

AP #1

1. 20% = 100 X 53.5g/x x = 267.5g - 53.5g = 214g of water

1 mole/ 0.214kg water = 4.67*m*

1. P1 = (P)(*X*1)

 mol ions = (2)(4.67 mol) = 9.34 mol

 1 kg water = 55.6 mol water

 

 P1= (28.8 mm Hg)(0.856) = 24.6 mm Hg

1. As the concentration of the solution increases, ions of the salt will be more likely to hit off of each other and temporarily connect effectively lowering the number of free particles in the solution.

AP #2

D i Since sulfur is a larger atom and has a bigger electron cloud, then the cloud can be warped easier creating stronger dispersion forces compared to oxygen which has a small radius.

ii) Water will have stronger dipole-diploe attractions since the oxygen has a higher electronegativity than sulfur. In fact water can create hydrogen bonds which are the strongest type of dipole-dipole attractions.

AP #3

1. PV = nRT (0.200atm)(1.00L) = n (0.0821 Latm/molK)(400K) n = 0.0061mole
2. 1.40atm – 0.20atm = 1.2atm O2

AP #4

1. Xe has the largest mass, and all gases have the same number of particles in the same volume of space under the same conditions.
2. If all particles are at the same temperature then they all have the same average kinetic energy.
3. Xe – since it is the largest atom, it will have the greatest ability to create dispersion forces by warping its electron cloud.
4. He – since it is the smallest atom, it will have the highest velocity which will increase the probability of a collision with the walls of the balloon in a location that it can escape.

Short answer

#4

a) Glucose doesn’t break up into ions, so the molality of glucose particles in solution is still 0.4. Na3PO4 will make 4 ions in solution and so it will have an ion concentration of 4 x 0.01 = 0.04m. KCl breaks up into two ions so 2x0.02 =0.04m

 b) The HF solution will have the highest vapor pressure because it breaks up into the smallest amount of particles since it is a weak acid. Vapor pressure is lowered when more particles are in solution so this will lower it the least.

 c) The CaBr2 solution will have the lowest freezing point because it will create the most particles in solution.

#5 A) 0.5 + 0.8 + 1.5 = 2.8MPa

 B) [(0.5)(103)/101.3](150) = n (0.0821 Latm/molK)(295) = 30.26mole C3H6 x 2mole C3H6 x 53.07g C3H3N = 1606g C3H3N √

 2 mole C3H6 1 mole C3H3N

[(0.8)(103)/101.3](150) = n (0.0821 Latm/molK)(295) = 48.91mole NH3 x 2mole C3H3N x 53.07g C3H3N = 2596g C3H3N

 2 mole NH3 1 mole C3H3N

[(1.5)(103)/101.3](150) = n (0.0821 Latm/molK)(295) = 90.78mol O2 x 2mole C3H6 x 53.07g C3H3N = 3212g C3H3N

 3 mole O2 1 mole C3H3N

#6 Heating ∆H = mC∆T (130g)(2.1J/goC)(40oC) = 10920J

 Melting ∆H = m∆Hf (130g)(333J/g) = 43290J

 Heating ∆H = mC∆T (130g)(4.184J/goC)(100oC) = 54392J

 Boiling ∆H = m∆Hvap (130g)(2436J/g) = 315380J

 Heating ∆H = mC∆T (130g)(1.8J/goC)(60oC) = 14040J = 437kJ