Chem.11-Q3W1-Water and Solutions- H.W

Matching

Match each statement with the correct item below.

a. dissolved molecule
b. heat of solution
c. are more soluble at lower temperature
d. contain particles larger than those in solutions
e. supersaturated solution
f. involves scattering light
g. ion in a crystal
h. is driven by differences in solution concentration
i. definition of molarity
j. ion in solution
k. dilute solution
l. generally increases solubility
m. hydrogen bond

____ 1. $K^+(aq)$
____ 2. moles solute per liter solution
____ 3. unstable
____ 4. osmosis
____ 5. temperature
____ 6. $C_6H_{12}O_6(aq)$
____ 7. O - H.....O - H
____ 8. Tyndall effect
____ 9. colloids
____ 10. heat term in A(s) - A(aq) + heat
____ 11. $K^+(s)$
____ 12. $10^{-10}M$ NaCl
____ 13. gases in water solutions

Match each item with the correct statement below.

a. true solutions
b. colloids
c. both
d. neither

____ 14. exhibit the Tyndall effect
____ 15. evenly distributed particles
____ 16. include proteins in blood
____ 17. heterogeneous mixture
____ 18. composition does not change upon standing
____ 19. particle size: typically individual atoms, ions, and small molecules
____ 20. particle size: clumps typically 10-100 times larger than a typical atom or molecule

Problem

The amount by which the freezing point of a solution is depressed or the boiling point is elevated is different for various solvents. The approximate values of these two quantities for the solvent water are given below. Calculate the freezing point and the boiling point of each of the solutions listed.

- *Freezing point depression = -1.86ºC for 1 mole of solute particles per liter solution*
- *Boiling point elevation = +0.52ºC for 1 mole of solute particles per liter solution*

21.

Solution E: 2*M* $AlCl_3$ F.P. = _____
B.P. = _____

A. -13.88ºC; 104.16ºC
B. -14.88ºC; 104.16ºC
C. -15.88ºC; 104.16ºC
D. -16.88ºC; 104.16ºC

22.

Solution B: 1*M* KCl F.P. = _____
B.P. = _____

A. -3.72ºC; 101.04ºC
B. -4.72ºC; 101.04ºC
C. -5.72ºC; 101.04ºC
D. -6.72ºC; 101.04ºC

23.

Solution F: 0.05*M* NaCl F.P. = _____
B.P. = _____

A. -0.186ºC; 98.052ºC
B. -0.186ºC; 99.052ºC
C. -0.186ºC; 100.052ºC
D. -0.186ºC; 101.052ºC

24.

Solution D: 0.5*M* NH_4Cl F.P. = _____
B.P. = _____

A. -1.86ºC; 100.52ºC
B. -1.96ºC; 100.52ºC
C. -2.06ºC; 100.52ºC
D. -2.08ºC; 100.52ºC

25.

Solution C: 5*M* C_2H_5OH F.P. = _____
B.P. = _____

A. -6.30ºC; 102.60ºC
B. -7.30ºC; 102.60ºC
C. -8.30ºC; 102.60ºC
D. -9.30ºC; 102.60ºC

26.

Solution A: 1*M* sucrose F.P. = _____
B.P. = _____

A. -1.66ºC; 100.52ºC
B. -1.76ºC; 100.52ºC
C. -1.86ºC; 100.52ºC
D. -1.96ºC; 100.52ºC

A group of students made a number of solutions of known concentration for the class stockroom. Unfortunately, they neglected to record all the information regarding the way in which the solutions were made. From the information provided in the chart below, determine the ten missing values indicated by the question marks.

Solute formula	**Solute mass**	**Solution volume**	**Molarity**
KOH	7.8 g	500 mL	?
LiCl	?	4.00 L	0.125*M*
$CaCl_2$	9.0 g	250 mL	?
$Al_2(SO_4)_3$	12.3 g	?	0.900*M*
K_3PO_4	?	250 mL	0.324*M*
$KClO_3$	122.5 g	?	1.0*M*
NH_4Br	?	2.0 L	0.50*M*
HNO_3	20.0 g	500 mL	?
HCl	?	750 mL	0.044*M*
$(NH_4)_2SO_4$	44.2 g	600 mL	?

27. _____ LiCl solute mass

A. 19.2 g
B. 20.2 g
C. 21.2 g
D. 22.2 g

28. _____ $KClO_3$ solution volume

A. 1.0 L
B. 1.2 L
C. 1.4 L
D. 1.6 L

29. _____ HCl solute mass

A. 0.9 g
B. 1.0 g
C. 1.1 g
D. 1.2 g

30. _____ NH_4Br solute mass

A. 95.0 g
B. 96.0 g
C. 97.0 g
D. 98.0 g

31. _____ KOH molarity

A. 0.26M
B. 0.28M
C.0.30M
D. 0.32M

32. _____ $Al_2(SO_4)_3$ solution volume

A. 38.0 Ml
B. 39.0 mL
C. 40.0 mL
D. 41.0 mL

33. _____ $(NH_4)_2SO_4$ molarity

A. 0.51*M*
B. 0.53*M*
C. 0.55*M*
D. 0.57*M*

34. _____ K_3PO_4 solute mass

A. 17.2 g
B. 18.2 g
C. 19.2 g
D. 20.2 g

35. _____ HNO_3 molarity

A. 0.635*M*
B. 0.645*M*
C. 0.655*M*
D. 0.665*M*

True/False
Indicate whether the statement is true or false.

____ 36. In a saturated solution, solute particles can be added into the solvent at a constant temperature and pressure.

____ 37. A molecule in the interior of a liquid is affected equally in all directions by intermolecular forces.

____ 38. Carbonated water is a solution of carbon monoxide in water.

____ 39. The surface tension of water decreases when a detergent is added to it.

____ 40. The meniscus in a test tube of water demonstrates the equal effect intermolecular forces have on all particles in a liquid.

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