Chem.11-Q3W1-Water and Solutions-Test

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

____ 1. In a saturated solution, solute particles can be added into the solvent at a constant temperature and pressure.

____ 2. A molecule in the interior of a liquid is affected equally in all directions by intermolecular forces.

____ 3. Carbonated water is a solution of carbon monoxide in water.

____ 4. The surface tension of water decreases when a detergent is added to it.

____ 5. The meniscus in a test tube of water demonstrates the equal effect intermolecular forces have on all particles in a liquid.

Matching

Match each item with the correct statement below.

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

____ 6. particle size: typically individual atoms, ions, and small molecules
____ 7. include proteins in blood
____ 8. particle size: clumps typically 10-100 times larger than a typical atom or molecule
____ 9. exhibit the Tyndall effect
____ 10. composition does not change upon standing
____ 11. heterogeneous mixture
___ 12. evenly distributed particles

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

____ 13. heat term in A(s) - A(aq) + heat
____ 14. $C_6H_{12}O_6(aq)$
____ 15. osmosis
____ 16. Tyndall effect
____ 17. $K^+(s)$
____ 18. colloids

____ 19. gases in water solutions
____ 20. $K^+(aq)$
____ 21. unstable
____ 22. $10^{-10}M$ NaCl
____ 23. moles solute per liter solution
____ 24. O - H.....O - H
____ 25. temperature

Problems

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*

26.

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

27.

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

28.

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

29.

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

30.

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

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	?

31. _____ LiCl solute mass C

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

32. _____ $KClO_3$ solution volume A

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

33. _____ HCl solute mass D

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

34. _____ NH_4Br solute mass D

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

35. _____ KOH molarity B

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

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