Chemistry

Name: _____

Section _____ COLLIGATIVE PROPERTIES Date: _____

Directions (1-15): For *each* statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Some questions may require the use of the *2011 Edition Reference Tables for Physical Setting/Chemistry*.

1 At standard pressure, when NaCl is added to water, the solution will have a

(1) higher freezing point and a lower boiling point than water
(2) higher freezing point and a higher boiling point than water.
(3) lower freezing point and a lower boiling point than water
(4) lower freezing point and a higher boiling point than water

2 What occurs as a salt dissolves in water?

(1) The number of ions in the solution increases and the freezing point decreases.
(2) The number of ions in the solution decreases and the freezing point decreases.
(3) The number of ions in the solution increases and the freezing point increases.
(4) The number of ions in the solution decreases and the freezing point increases.

3 Compared to a 0.1 M aqueous solution of NaCl, a 0.8 M aqueous solution of NaCl has a

(1) lower boiling point and a higher freezing point
(2) higher boiling point and a lower freezing point
(3) lower boiling point and a lower freezing point
(4) higher boiling point and a higher freezing point

4 Why is salt (NaCl) put on icy roads and sidewalks in the winter?

(1) It is covalent and lowers the freezing point of water.
(2) It is covalent and raises the freezing point of water.
(3) It is ionic and lowers the freezing point of water.
(4) It is ionic and raises the freezing point of water.

5 At standard pressure, how do the boiling point and freezing point of $NaCl_{(aq)}$ compare to the boiling point and freezing point of $H_2O_{(\ell)}$?

(1) Both the boiling point and the freezing point of $NaCl_{(aq)}$ are higher.
(2) The boiling point of $NaCl_{(aq)}$ is higher, and the freezing point of $NaCl_{(aq)}$ is lower.
(3) The boiling point of $NaCl_{(aq)}$ is lower, and the freezing point of $NaCl_{(aq)}$ is higher.
(4) Both the boiling point and the freezing point of $NaCl_{(aq)}$ are lower.

6 Which solution would have the *lowest* freezing point?

(1) 1 mole of NaCl dissolved in 1000 g of H_2O
(2) 1 mole of NaCl dissolved in 500 g of H_2O
(3) 0.5 mole of NaCl dissolved in 1000 g of H_2O
(4) 0.5 mole of NaCl dissolved in 500 g of H_2O

7 How do the freezing and boiling points of a sample of water change when 1 mole of NaCl is dissolved in it?

(1) The freezing point decreases and the boiling point increases.
(2) The freezing point increases and the boiling point decreases.
(3) The freezing point decreases and the boiling point decreases.
(4) The freezing point increases and the boiling point increases.

8 Compared to a 2.0 M aqueous solution of NaCl at 1 atmosphere, a 3.0 M aqueous solution of NaCl at 1 atmosphere has a

(1) higher boiling point and a lower freezing point
(2) higher boiling point and a higher freezing point
(3) lower boiling point and a lower freezing point
(4) lower boiling point and a higher freezing point

Created 10 February 2019

9 Compared to the freezing point of 1.0 M $KCl_{(aq)}$ at standard pressure, the freezing point of 1.0 M $CaCl_{2\,(aq)}$ at standard pressure is

(1) higher
(2) lower
(3) the same

10 What occurs when $NaCl_{(s)}$ is added to water?

(1) The boiling point of the solution decreases, and the freezing point of the solution increases.
(2) The boiling point of the solution increases, and the freezing point of the solution increases.
(3) The boiling point of the solution increases, and the freezing point of the solution decreases.
(4) The boiling point of the solution decreases, and the freezing point of the solution decreases.

11 How do the boiling point and freezing point of a solution of water and calcium chloride at standard pressure compare to the boiling and freezing point of water at standard pressure?

(1) Both the freezing point and the boiling point of the solution are higher.
(2) The freezing point of the solution is lower and the boiling point of the solution is higher.
(3) The freezing point of the solution is higher and the boiling point of the solution is lower.
(4) Both the freezing point and the boiling point of the solution are lower.

12 Which solution has the highest boiling point at standard pressure?

(1) 0.10 M $KCl_{(aq)}$
(2) 0.10 M $K_3PO_{4\,(aq)}$
(3) 0.10 M $KNO_{3\,(aq)}$
(4) 0.10 M $K_2SO_{4\,(aq)}$

13 Compared to pure water, an aqueous solution of calcium chloride has a

(1) higher boiling point and lower freezing point
(2) higher boiling point and higher freezing point
(3) lower boiling point and higher freezing point
(4) lower boiling point and lower freezing point

14 Which solution has the *lowest* freezing point?

(1) 30. g of KI dissolved in 100. g of water
(2) 40. g of KI dissolved in 200. g of water
(3) 10. g of KI dissolved in 100. g of water
(4) 20. g of KI dissolved in 200. g of water

15 Compared to the freezing point and boiling point of water at 1 atmosphere, a solution of a salt and water at 1 atmosphere has a

(1) lower freezing point and lower boiling point
(2) higher freezing point and higher boiling point
(3) higher freezing point and lower boiling point
(4) lower freezing point and higher boiling point