

Name:

Introduction to Solutions Questions

1. The attraction between water molecules and an Na^+ ion or a Cl^- ion occurs because water molecules are

- A) linear B) symmetrical
C) polar D) nonpolar

2. In an aqueous solution of potassium chloride, the solute is

- A) Cl B) K C) KCl D) H_2O

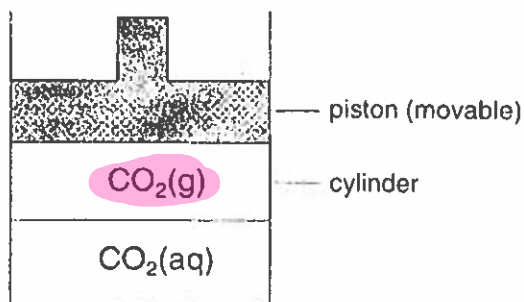
3. A mixture consists of sand and an aqueous salt solution. Which procedure can be used to separate the sand, salt, and water from each other?

- A) Evaporate the water, then filter out the salt.
B) Evaporate the water, then filter out the sand.
C) Filter out the salt, then evaporate the water.
D) Filter out the sand, then evaporate the water.

4. Under which conditions of temperature and pressure is a gas most soluble in water?

- A) high temperature and low pressure
B) high temperature and high pressure
C) low temperature and low pressure
D) low temperature and high pressure

5. Given the diagram below that shows carbon dioxide in an equilibrium system at a temperature of 298 K and a pressure of 1 atm:



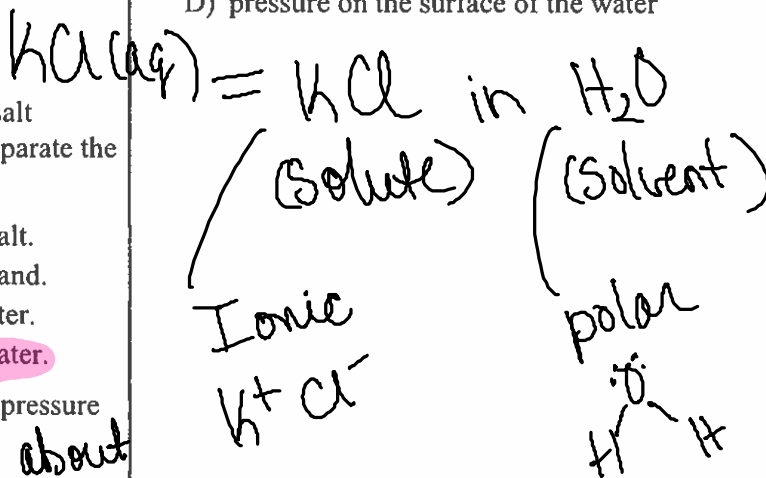
Which changes *must* increase the solubility of the carbon dioxide?

- A) increase pressure and decrease temperature
B) increase pressure and increase temperature
C) decrease pressure and decrease temperature
D) decrease pressure and increase temperature

6. The solubility of a salt in a given volume of water depends primarily on the

- A) surface area of the salt crystals
B) temperature of the water
C) rate at which the salt and water are stirred
D) pressure on the surface of the water

Solid (ionic)



think about Soda

Base your answers to questions 7 and 8 on the information below.

Naphthalene, a nonpolar substance that sublimates at room temperature, can be used to protect wool clothing from being eaten by moths.

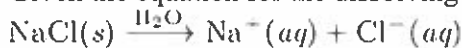
7. Explain why naphthalene is *not* expected to dissolve in water. *It is nonpolar*
8. Explain, in terms of *intermolecular forces*, why naphthalene sublimates. *Weak IMF (s → g)*
9. Base your answer to the following question on the information below.

A student uses 200 grams of water at a temperature of 60°C to prepare a saturated solution of potassium chloride, KCl.

Identify the solute in this solution. *KCl, potassium chloride*

10. Base your answer to the following question on the information below.

Given the equation for the dissolving of sodium chloride in water:



Explain, in terms of *particles*, why NaCl(s) does *not* conduct electricity.

Na⁺ & Cl⁻ ions are not mobile in solid NaCl.



Name:

Solubility and Table F Practice

1. According to Table F, which ions combine with chloride ions to form an insoluble compound? *See exception column*
A) Fe^{2+} ion B) Ca^{2+} ions C) Li^{+} ions D) Ag^{+} ions
Insoluble
2. Which compound is insoluble in water?
A) BaSO_4 B) CaCrO_4 *soluble* C) KClO_3 *soluble* D) Na_2S *soluble*
 $\text{Ba}^{+2} \text{SO}_4^{-2}$ $\text{Ca}^{+2} \text{CrO}_4^{-2}$ $\text{K}^{+} \text{ClO}_3^{-}$ $\text{Na}^{+} \text{S}^{-2}$
3. Which ion, when combined with chloride ions, Cl^{-} , forms an insoluble substance in water? *See exception column*
A) Fe^{2+} B) Mg^{2+} C) Pb^{2+} D) Zn^{2+}
4. According to Reference Table F, which substance is most soluble? *(only soluble choice)*
A) AgI *insol.* B) CaSO_4 *insol.* C) PbCl_2 *insol.* D) $(\text{NH}_4)_2\text{CO}_3$
 $\text{Ag}^{+} \text{I}^{-}$ $\text{Ca}^{+2} \text{SO}_4^{-2}$ $\text{Pb}^{+2} \text{Cl}^{-}$ $\text{NH}_4^{+} \text{CO}_3^{-2}$
always soluble
5. Based on Reference Table F, which salt is *least* soluble?
A) FeCO_3 B) Na_2CO_3 C) BaCl_2 D) CaCl_2
 $\text{Fe}^{+2} \text{CO}_3^{-2}$ $\text{Na}^{+} \text{CO}_3^{-2}$ $\text{Ba}^{+2} \text{Cl}^{-}$ $\text{Ca}^{+2} \text{Cl}^{-}$
6. In an aqueous solution of potassium chloride, the solute is $\text{KCl(aq)} = \text{KCl in H}_2\text{O}$
A) Cl B) K C) KCl D) H_2O
what dissolves $\text{H}-\overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{O}}}-\text{H}$
 H_2O polar
7. The attraction between water molecules and an Na^{+} ion or a Cl^{-} ion occurs because water molecules are
A) linear B) symmetrical C) polar D) nonpolar
8. Which ion combines with Ba^{2+} to form a compound that is most soluble in water?
A) S^{2-} B) OH^{-} C) CO_3^{2-} D) SO_4^{2-}
 BaS Ba(OH)_2 BaCO_3 BaSO_4
9. Which barium salt is *insoluble* in water?
A) BaCO_3 B) BaCl_2 C) $\text{Ba(ClO}_4)_2$ D) $\text{Ba(NO}_3)_2$
 $\text{Ba}^{+2} \text{Cl}^{-}$ $\text{Ba}^{+2} \text{ClO}_4^{-}$ $\text{Ba}^{+2} \text{NO}_3^{-}$
10. According to Reference Table F, which of these compounds is most soluble at 298 K and 1 atm?
A) AgNO_3 B) AgCl C) PbCrO_4 D) PbCO_3
 $\text{Ag}^{+} \text{NO}_3^{-}$ $\text{Ag}^{+} \text{Cl}^{-}$ $\text{Pb}^{+2} \text{CrO}_4^{-2}$ $\text{Pb}^{+2} \text{CO}_3^{-2}$