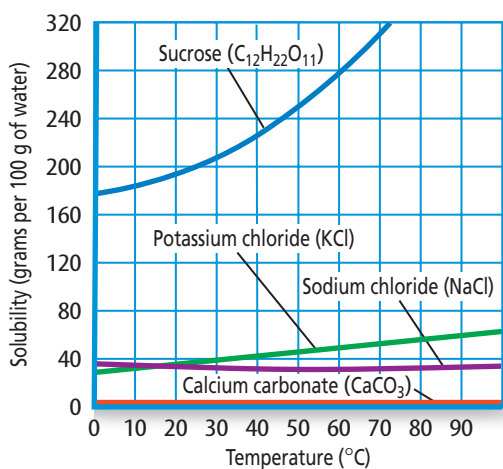


**Guided Responses for TAKS Self-Check Exam Practice IPC TEKS 9A, 9B, and 9C
TX BDOL p TX24**

1. Which of the following would not dissolve in water? (IPC 9A)
A) a nonpolar solute

Solution Water is a polar solvent. Although many polar and ionic compounds will dissolve in water, nonpolar solutes usually will not dissolve in water.

Use the information below and your knowledge of science to answer questions 2–4.



2. According to the graph above, which of the compounds below has the largest change in solubility as temperature rises? (IPC 9D)
F) C₁₂H₂₂O₁₁

Solution According to the graph, the solubility of sucrose increases from about 180 to over 320 grams per 100 g of water in the temperature range from 0°C to 70°C. The solubility of sodium chloride and calcium carbonate are nearly constant over that temperature range, and the solubility of KCl changes by only about 20 grams per 100 g of water.

3. Which of the following compounds shown on the graph above are ionic compounds? (IPC 7D)
A) KCl and NaCl

Solution Cl is on the far right of the periodic table in Group 17. Na and K are on the far left of the periodic table in Group 1. Ionic compounds are formed between atoms at

opposite ends of the periodic table, so NaCl and KCl are ionic compounds.

4. If the maximum amount of sucrose is dissolved in 100.0 g of water at 60 °C, and the volume of the solution is 281.0 cm³, what is the density of the solution? (IPC 7A)
H) 1.35 g/cm³

Solution The maximum amount of sucrose that will dissolve in 100 g of water at 60°C is 280 g. The density of the resulting solution can be calculated from the equation:

$$D = \frac{m}{V}$$

The total mass of the solution, m , is the mass of the water plus the mass of the sugar:

$$m = 280 \text{ g} + 100 \text{ g} = 380 \text{ g}$$

The volume of the solution, V , equals 281.0 cm³. So the density is

$$D = \frac{m}{V} = \frac{380 \text{ g}}{281.0 \text{ cm}^3} = 1.35 \text{ g/cm}^3$$

5. An acid is dissolved in water. Which of the following best describes what happens as the acid dissolves? (IPC 9B)
A) H⁺ ion concentration increases—pH decreases

Solution When an acid dissolves in water, the H⁺ ion concentration in the water increases. As the H⁺ ion concentration increases the solution becomes more acidic, and the pH of the solution decreases.

6. Which of the following properties of water is most responsible for its ability to dissolve many solutes? (IPC 9A)
H) It is polar.

Solution One end of a water molecule is slightly negatively charged and the other end is slightly positively charged. This makes water a polar molecule. Because water is polar, it can be attracted to oppositely charged parts of solute molecules, and pull the molecules away from a solid solute crystal into solution.

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7. An experiment shows that an acid dissolved in water conducts electricity. If more acid is added to the solution, which of the following best describes what will happen? **(IPC 9B)**

A) The electrical conductivity will increase because the concentration of ions increases.

Solution An acid is an electrolyte because it forms ions when it is dissolved. When electrodes are placed in a solution containing ions, the ions can move toward the oppositely charged electrodes, causing an electric current to flow. As the ion concentration increases, the number of ions that can flow also increases. This causes the current to increase. Therefore the electrical conductivity of an ionic solution increases as the concentration of ions increases.

8. Which of the following increases the rate at which a solid solute dissolves in a solvent? **(IPC 9D)**

G) stirring the solution

Solution The rate of solution can be increased by increasing the temperature, decreasing the size of the solute particles, or stirring the solution. Increasing the pressure has little effect on the solubility of a solid.