

## CHM 130: Chapter 14 Blackboard Homework Questions

1. Check all of the statements below that are **true**:
  - a) The solubility of a gas in a liquid increases as temperature increases.
  - b) The solubility of a gas in a liquid decreases as temperature increases.
  - c) The solubility of a solid in a liquid increases as temperature increases.
  - d) The solubility of a solid in a liquid decreases as temperature increases.
  - e) The solubility of a gas in a liquid increases as the partial pressure of the gas above the liquid increases.
  - f) The solubility of a solid in a liquid increases as the partial pressure of the gas above the liquid increases.
2. The “like dissolves like” rule indicates which of the following:
  - a) A nonpolar solid will dissolve in a nonpolar solvent.
  - b) A polar solid will dissolve in a polar solvent.
  - c) A nonpolar solid will dissolve in a polar solvent.
  - d) A polar solid will dissolve in a nonpolar solvent.
  - e) A nonpolar liquid is miscible with a nonpolar solvent.
  - f) A polar liquid is miscible with a polar solvent.
  - g) A polar liquid is miscible with a nonpolar solvent.
  - h) A nonpolar liquid is miscible with a polar solvent.
3. Check all of the statements below that are **true**:
  - a) An ionic compound will always dissolve in a polar solvent.
  - b) An ionic compound will never dissolve in a polar solvent.
  - c) An ionic compound will always dissolve in a nonpolar solvent.
  - d) An ionic compound will never dissolve in a nonpolar solvent.
  - e) Check the Solubility Rules to determine if an ionic compound dissolves in a polar solvent.
  - f) Check the Solubility Rules to determine if an ionic compound dissolves in a nonpolar solvent.
4. Check all of the substances below that are soluble in or miscible with water:
  - a) ammonia,  $\text{NH}_3$  (l)
  - b) vegetable oil
  - c) ethanol,  $\text{C}_2\text{H}_5\text{OH}$  (l), a polar molecule
  - d)  $\text{PbCl}_2$
  - e) pentane,  $\text{C}_5\text{H}_{12}$  (l), a nonpolar molecule
  - f)  $\text{Li}_2\text{CO}_3$
  - g) iodine,  $\text{I}_2$  (s)
  - h)  $\text{Sr}(\text{OH})_2$
  - i)  $\text{BaCO}_3$
5. Check all of the substances below that are soluble in or miscible with bromine,  $\text{Br}_2$  (l):
  - a) ammonia,  $\text{NH}_3$  (l)
  - b) vegetable oil
  - c) ethanol,  $\text{C}_2\text{H}_5\text{OH}$  (l), a polar molecule
  - d)  $\text{PbCl}_2$
  - e) pentane,  $\text{C}_5\text{H}_{12}$  (l), a nonpolar molecule
  - f)  $\text{Li}_2\text{CO}_3$
  - g) iodine,  $\text{I}_2$  (s)
6. Check all of the statements that will **increase the rate of dissolving** sugar in water:

- a) Shaking the solution.
  - b) Heating the sugar to form a caramel before dissolving it.
  - c) Using boiling water.
  - d) Using refrigerated water.
  - e) Using raw crystallized sugar chunks rather than powdered sugar.
7. Putting a few packets of sugar in a glass of iced tea and stirring the solution still leaves undissolved sugar crystals at the bottom of the glass. The iced tea is now \_\_\_\_\_ solution.
- a) an unsaturated
  - b) a saturated
  - c) a supersaturated
  - d) polyunsaturated
8. Dissolving the maximum amount of solid that can be dissolved in a solvent at a higher temperature then allowing the solution to cool without disturbing it will result in \_\_\_\_\_ solution. The excess solid dissolved in the solution will recrystallize if disturbed at the lower temperature.
- a) an unsaturated
  - b) a saturated
  - c) a supersaturated
  - d) polyunsaturated
9. Putting a few granules of sugar in a glass of iced tea and stirring the solution results in \_\_\_\_\_ solution.
- a) an unsaturated
  - b) a saturated
  - c) a supersaturated
  - d) polyunsaturated
10. Calculate the mass percent concentration for 15.0 g of  $\text{CaCl}_2$  dissolved in 250.0 g of solution.
11. Calculate the mass percent concentration for 7.50 g of KBr in 100.0 g of water.
12. What mass of water is present in 100 g of a 5.00% NaCl solution?
13. What mass of solute is present in 75.0 g of a 5.00%  $\text{HNO}_3$  (aq) solution?
14. What mass of solution contains 15.0 g of solute in a 5.25% KOH solution?
15. What mass of solvent is required to dissolve 25.0 g of NaCl to prepare a 5.00% NaCl solution?
16. Calculate the molarity for a solution prepared by dissolving 0.500 moles of NaCl to make 2.00 L of solution.
17. Calculate the molarity for a solution prepared by dissolving 25.0 g of NaOH to make 1.50 L of solution.
18. Calculate the molarity for a solution prepared by dissolving 50.0 g of KBr to make 500.0 mL of solution.
19. Calculate the number of moles of NaOH present in 150.0 mL of a 1.25 M NaOH solution.
20. Calculate the mass of NaCl present in 250.0 mL of a 2.50 M NaCl solution.