Saturation & Solubility Curves

1. Which compound is *least* soluble in 100 grams of water at 40°C?

   A) NaCl B) NH_4Cl
   C) SO_2 D) $KClO_3$

2. According to Reference Table *G*, which of these substances is most soluble at 60°C?

   A) NaCl B) NH_4Cl
   C) $KClO_3$ D) KCl

3. An unsaturated solution is formed when 80. grams of a salt is dissolved in 100. grams of water at 40.°C. This salt could be

   A) KNO_3 B) NaCl
   C) $NaNO_3$ D) KCl

4. As additional $KNO_3(s)$ is added to a saturated solution of KNO_3 at constant temperature, the concentration of the solution

   A) decreases B) increases
   C) remains the same

5. According to Reference Table G, which is the best description of the system prepared by dissolving 30 grams of $NH_3(g)$ in 100 grams of water at 20°C?

   A) a saturated solution of NH_3 in contact with excess $NH_3(g)$
   B) an unsaturated solution of NH_3 with no excess $NH_3(g)$
   C) a saturated solution of NH_3 with no excess $NH_3(g)$
   D) an unsaturated solution of NH_3 in contact with excess $NH_3(g)$

6. A student tested the solubility of a salt at different temperatures and then used Reference Table g to identify the salt. The student's data table appears below.

Temperature (°C)	g of salt per 10 g of water
30	1.2
50	2.2
62	3.0
76	4.0

   What is the identity of the salt?

   A) ammonium chloride
   B) potassium nitrate
   C) potassium chlorate
   D) sodium chloride

7. A solution contains 100 grams of a nitrate salt dissolved in 100 grams of water at 50°C. The solution could be a

   A) supersaturated solution of $NaNO_3$
   B) supersaturated solution of KNO_3
   C) saturated solution of $NaNO_3$
   D) saturated solution of KNO_3

8. Which compound is *least* soluble in water at 60. °C?

   A) NH_4Cl B) KNO_3
   C) $KClO_3$ D) NaCl

9. An unsaturated aqueous solution of NH_3 is at 90°C in 100. grams of water. According to Reference Table *G*, how many grams of NH_3 could this unsaturated solution contain?

   A) 10. g B) 15 g C) 20. g D) 5 g

10. Which compound becomes *less* soluble in water as the temperature of the solution is increased?

    A) NH_4Cl B) NaCl
    C) HCl D) KCl

11. According to your Reference Tables, which substance forms an unsaturated solution when 80 grams of the substance is dissolved in 100 grams of H_2O at 10°C?

A) $NaNO_3$ B) KNO_3
C) KI D) NaCl

12. A saturated solution of $NaNO_3$ is prepared at 60.°C using 100. grams of water. As this solution is cooled to 10.°C, $NaNO_3$ precipitates (settles) out of the solution. The resulting solution is saturated. Approximately how many grams of $NaNO_3$ settled out of the original solution?

A) 85 g B) 126 g
C) 46 g D) 61 g

13. A student adds solid KCl to water in a flask. The flask is sealed with a stopper and thoroughly shaken until no more solid KCl dissolves. Some solid KCl is still visible in the flask. The solution in the flask is

A) saturated and is at equilibrium with the solid KCl
B) unsaturated and is not at equilibrium with the solid KCl
C) unsaturated and is at equilibrium with the solid KCl
D) saturated and is not at equilibrium with the solid KCl

14. Based on Reference Table *G*, what is the maximum number of grams of KCl(s) that will dissolve in 200 grams of water at 50°C to produce a saturated solution?

A) 38 g B) 42 g C) 58 g D) 84 g

15. According to Reference Table G, how does a decrease in temperature from 40°C to 20°C affect the solubility of NH_3 and KCl?

A) The solubility of NH_3 increases, and the solubility of KCl increases.
B) The solubility of NH_3 increases, and the solubility of KCl decreases.
C) The solubility of NH_3 decreases, and the solubility of KCl increases.
D) The solubility of NH_3 decreases, and the solubility of KCl decreases.

16. When an equilibrium exists between the dissolved and the undissolved solute in a solution, the solution must be

A) unsaturated B) saturated
C) diluted D) supersaturated

17. A solution containing 90. grams of KNO_3 per 100. grams of H_2O at 50.°C is considered to be

A) dilute and supersaturated
B) concentrated and unsaturated
C) dilute and unsaturated
D) concentrated and supersaturated

18. A student prepares four aqueous solutions, each with a different solute. The mass of each dissolved solute is shown in the table below.

Mass of Dissolved Solute for Four Aqueous Solutions

Solution Number	Solute	Mass of Dissolved Solute (per 100. g of H_2O at 20.°C)
1	KI	120. g
2	$NaNO_3$	88 g
3	KCl	25 g
4	$KClO_3$	5 g

Which solution is saturated?

A) 2 B) 3 C) 1 D) 4

19. What is the total mass of KNO_3 that must be dissolved in 50. grams of H_2O at 60.°C to make a saturated solution?

A) 106 g B) 32 g
C) 53 g D) 64 g

20. How many grams of $NaNO_3$ would have to be added to 100. grams of water at 45°C to make a saturated solution of this salt?

A) 120. B) 110. C) 130. D) 100.