Name: _____

___ 1) The graph below represents four solubility curves. Which curve *best* represents the solubility of a gas in water?

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

___ 2) A solution containing 90. grams of KNO_3 per 100. grams of H_2O at 50.°C is considered to be
1) concentrated and unsaturated
2) dilute and unsaturated
3) dilute and supersaturated
4) concentrated and supersaturated

___ 3) Which solution is the *most* concentrated?
1) 2 moles of solute dissolved in 3 liters of solution
2) 4 moles of solute dissolved in 8 liters of solution
3) 6 moles of solute dissolved in 4 liters of solution
4) 1 mole of solute dissolved in 1 liter of solution

___ 4) According to the *Solubility Curves* chemistry reference table, how does a decrease in temperature from 40°C to 20°C affect the solubility of NH_3 and KCl?
1) The solubility of NH_3 increases, and the solubility of KCl decreases.
2) The solubility of NH_3 increases, and the solubility of KCl increases.
3) The solubility of NH_3 decreases, and the solubility of KCl decreases.
4) The solubility of NH_3 decreases, and the solubility of KCl increases.

___ 5) What is the concentration of a solution which contains 1 mole of $CaCl_2$ dissolved in 2,000 milliliters of solution?
1) 1. M   3) 0.25 M
2) 2. M   4) 0.5 M

___ 6) Which solution has the *highest* boiling point?
1) 1 mole of $NaNO_3$ in 1000 g of water
2) 1 mole of $NaNO_3$ in 500 g of water
3) 1 mole of $NaNO_3$ in 250 g of water
4) 1 mole of $NaNO_3$ in 750 g of water

___ 7) How many grams of $NaNO_3$ per 100 grams of H_2O would produce a supersaturated solution?
1) 60 g at 10°C
2) 90 g at 30°C
3) 80 g at 20°C
4) 110 g at 40°C

___ 8) Based on the *Solubility Curves* chemistry reference table, which salt solution could contain 42 grams of solute per 100 grams of water at 40°C?
1) a saturated solution of KCl
2) an unsaturated solution of NH_4Cl
3) a saturated solution of $KClO_3$
4) an unsaturated solution of NaCl

___ 9) A student determined the mass, in grams, of compound *X* that would saturate 30. grams of water over a temperature range of 40°C in 10.-degree intervals. The results are tabulated below.

Grams of Dissolved Compound *X*	Temperature of 30. grams of H_2O
2.0 g	10.°C
4.0 g	20.°C
8.0 g	30.°C
16 g	40.°C
32 g	50.°C

If this solubility trend continues, what is the total number of grams of compound *X* that will dissolve in 30. grams of water at 60.°C?
1) 32   3) 64
2) 16   4) 48

___ 10) Which salt has the *greatest* change in solubility between 30°C and 50°C?

1) NaCl 3) NaNO$_3$
2) KCl 4) KNO$_3$

___ 11) Based on the *Solubility Curves* chemistry reference table, when 100 grams of water saturated with KNO$_3$ at 70°C is cooled to 25°C, the total number of grams of KNO$_3$ that will precipitate is

1) 30 g 3) 45 g
2) 80 g 4) 95 g

___ 12) What is the molarity of a solution of KNO$_3$ (molecular mass = 101) that contains 404 grams of KNO$_3$ in 2.00 liters of solution?

1) 1.00 M 3) 0.500 M
2) 2.00 M 4) 4.00 M

___ 13) What is the molarity of a solution that contains 40. grams of NaOH in 0.50 liter of solution?

1) 1.0 M 3) 0.25 M
2) 2.0 M 4) 0.50 M

___ 14) Which solution contains the *greatest* number of moles of solute?

1) 0.5 L of 0.5 M
2) 0.5 L of 2 M
3) 2 L of 0.5 M
4) 2 L of 2 M

___ 15) A solution contains 14 grams of KCl in 100. grams of water at 40.°C. What is the minimum amount of KCl that must be added to make this a saturated solution?

1) 19 g 3) 25 g
2) 44 g 4) 14 g

___ 16) A solution contains 90 grams of a salt dissolved in 100 grams of water at 40°C. The solution could be an unsaturated solution of

1) NaCl 3) NaNO$_3$
2) KCl 4) KNO$_3$

___ 17) What is the total number of grams of NaOH (formula mass = 40.) needed to make 1.0 liter of a 0.20 M solution?

1) 80. g 3) 20. g
2) 8.0 g 4) 2.0 g

___ 18) In an aqueous solution of potassium chloride, the solute is

1) H$_2$O 3) K
2) Cl 4) KCl

___ 19) How many moles of H$_2$SO$_4$ are needed to prepare 5.0 liters of a 2.0 M solution of H$_2$SO$_4$?

1) 10. 3) 5.0
2) 20. 4) 2.5

___ 20) At 10°C, 23 grams of a substance saturates 100. grams of water. The substance could be

1) KNO$_3$ 3) KCl
2) NaNO$_3$ 4) NH$_4$Cl

___ 21) According to the *Solubility Curves* chemistry reference table, a temperature change from 60°C to 90°C has the *least* effect on the solubility of

1) NH$_3$ 3) KClO$_3$
2) KCl 4) SO$_2$

___ 22) How many liters of a 0.5 M sodium hydroxide solution would contain 2 moles of solute?

1) 1 L 3) 3 L
2) 2 L 4) 4 L

___ 23) How many grams of KNO$_3$ are needed to saturate 50. grams of water at 70.°C?

1) 130 g 3) 30 g
2) 65 g 4) 160 g

___ 24) Based on the *Solubility Curves* chemistry reference table, what change will cause the solubility of KNO$_3$(s) to increase?

1) decreasing the pressure
2) decreasing the temperature
3) increasing the temperature
4) increasing the pressure

___ 25) The freezing point of a 1.00-molal solution of C$_2$H$_4$(OH)$_2$ is *closest* to

1) +1.86°C 3) -1.86°C
2) +3.72°C 4) -3.72°C

___ 26) According to the *Solubility Curves* chemistry reference table, what is the maximum number of grams of NH$_4$Cl that will dissolve in 200 grams of water at 70°C?

1) 85 g 3) 100 g
2) 62 g 4) 124 g

___ 27) Based on the *Solubility Guidelines* chemistry reference table, a saturated solution of which salt would be *most* concentrated?

1) $PbCrO_4$ 3) AgCl

2) $BaSO_4$ 4) $ZnCl_2$

___ 28) 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 increases and the boiling point decreases.

2) The freezing point increases and the boiling point increases.

3) The freezing point decreases and the boiling point increases.

4) The freezing point decreases and the boiling point decreases.

___ 29) Which expression defines the molality (*m*) of a solution?

1) $\dfrac{\text{moles of solute}}{\text{kg of solution}}$

2) $\dfrac{\text{grams of solute}}{\text{kg of solution}}$

3) $\dfrac{\text{grams of solute}}{\text{kg of solvent}}$

4) $\dfrac{\text{moles of solute}}{\text{kg of solvent}}$

___ 30) What is the molarity of a solution that contains 112 grams of KOH in 2.00 liters of solution?

1) 1.00 M   3) 3.00 M

2) 2.00 M   4) 4.00 M

___ 31) A student dissolves 1.0 mole of sucrose ($C_{12}H_{22}O_{11}$) in 1,000. grams of water at 1.0 atmosphere. Compared to the boiling point of pure water, the boiling point of the resulting solution is

1) $0.52°C$ lower

2) $0.52°C$ higher

3) $1.86°C$ lower

4) $1.86°C$ higher

___ 32) Based on the *Solubility Guidelines* chemistry reference table, which saturated solution would be the *least* concentrated?

1) potassium sulfate

2) barium sulfate

3) lithium sulfate

4) sodium sulfate

___ 33) How many grams of ammonium chloride (gram formula mass = 53.5 g) are contained in 0.500 L of a 2.00 M solution?

1) 53.5 g   3) 107 g

2) 26.5 g   4) 10.0 g

___ 34) At standard pressure, a 1-molal solution of sugar has a boiling point

1) greater than $100°C$ and a freezing point of greater than $0°C$

2) greater than $100°C$ and a freezing point of less than $0°C$

3) less than $100°C$ and a freezing point of greater than $0°C$

4) less than $100°C$ and a freezing point of less than $0°C$

___ 35) According to the *Solubility Curves* chemistry reference table, which of the following is the *best* description of the system prepared by dissolving 30 grams of $NH_3(g)$ in 100 grams of water at 20°?

1) an unsaturated solution of NH_3 with no excess $NH_3(g)$

2) a saturated solution of NH_3 with no excess $NH_3(g)$

3) a saturated solution of NH_3 in contact with excess $NH_3(g)$

4) an unsaturated solution of NH_3 in contact with excess $NH_3(g)$

___ 36) A solution will boil at the *highest* temperature when it contains 1 mole of nonvolatile solute dissolved in

1) 250 g of solvent

2) 750 g of solvent

3) 1,000 g of solvent

4) 500 g of solvent

___ 37)   A student obtained the following data in a chemistry laboratory.

Trial	Temperature (°C)	Solubility (grams of KNO_3/100 g of H_2O)
1	25	40
2	32	50
3	43	70
4	48	60

Based on the *Solubility Curves* chemistry reference table, which of the trials seems to be in error?

1)   1   2)   2   3)   3   4)   4

___ 38)   The following data were recorded while determining the solubility of a certain salt.

Temperature (°C)	10	20	30	40	50
Grams Solute/100. g H_2O	30	33	36	39	42

Which graph *best* represents the solubility of this salt?

1)

3)

2)

4)