Answer Key: SHOW ALL WORK for questions 21-26.

1. A
2. D
3. B
4. C
5. C
6. D
7. D
8. A
9. B
10. D
11. C
12. C
13. B
14. C
15. B
16. 108 g ✓
17. 150 g ✓
18. 25 g ✓
19. supersaturated ✓
20. $Ce_2(SO_4)_3$ ✓

21. $M = \frac{0.34}{0.35} = \boxed{0.97\ M}$ $\quad \frac{65g}{1} \cdot \frac{1\ mol}{189.369}$

22. $(100)(1) = (0.25)(x)$ $\quad 400 - 100 = \boxed{300}$
$x = 400$

23. $\frac{1.2\ m}{1} = \frac{x}{1.56}$ $\quad \boxed{x = 1.872\ mol}$

24. $\frac{8.35\%}{100} = \frac{65g}{x} \cdot 100$

$\frac{6500}{8.35} = \frac{8.35x}{8.35}$ $\quad x = 778.44$

$x - 65 = \boxed{713.44\ g\ H_2O}$

25. $\% = \frac{15}{415} \cdot 100$

$\boxed{\% = 3.61}$

26. $(100)(12.5) = 545x$

$\frac{1250}{545} = x$

$x = \boxed{2.29\ M}$

0.97 M

300 mL H_2O

1.872 mol

713.44 g

3.61 %

2.29 M

Name:

Group Practice Unit 12: Solutions

Multiple choice (2 pts).

_____ 1. The solute is _____.
A. the substance that is dissolved
B. the substance that dissolves another substance
C. the solubility of the substance
D. the whole solution

_____ 2. You have 20 grams of a solute and you heat the solution to completely dissolve it. What happens to the solution as it starts to cool?
A. it starts to vaporize
B. it starts to melt
C. it starts become reactive
D. it starts to crystallize

_____ 3. A solution which contains a small amount of solute in a large amount of solvent is said to be _____.
A. concentrated B. dilute C. boiling D. supersaturated

_____ 4. A solution that contains more solute than a solvent can theoretically hold is called ____.
A. saturated
B. unsaturated
C. supersaturated
D. quasisaturated

_____ 5. A solid's solubility is best in a liquid solvent when the solution is under ___ temperature
A. low B. normal C. high D. temp does not affect solubility

_____ 6. The most common or universal solvent is _____.
A. ethanol B. glucose C. sodium chloride D. water

_____ 7. The properties of a solvent are changed when a solute is added. This is an example of a _____ property.
A. chemical B. reactionary C. inert D. colligative

_____ 8. As the temperature increases, the solubility *decreases* for ____.
A. gases
B. solids
C. ionic substances
D. saturated solutions

_____9. Which of the following will dissolve in water?
A. carbon tetrafluoride
B. magnesium chloride
C. copper
D. methane (CH_4)

_____10. Which of the following will <u>not dissolve</u> when mixed with iodine (I_2)?
A. CF_4 B. methane (CH_4) C. oil D. water

_____11. As a gas dissolves in a liquid, increasing the agitation will _____ the solubility.
A. remains the same B. increase C. decrease D. increase then decrease

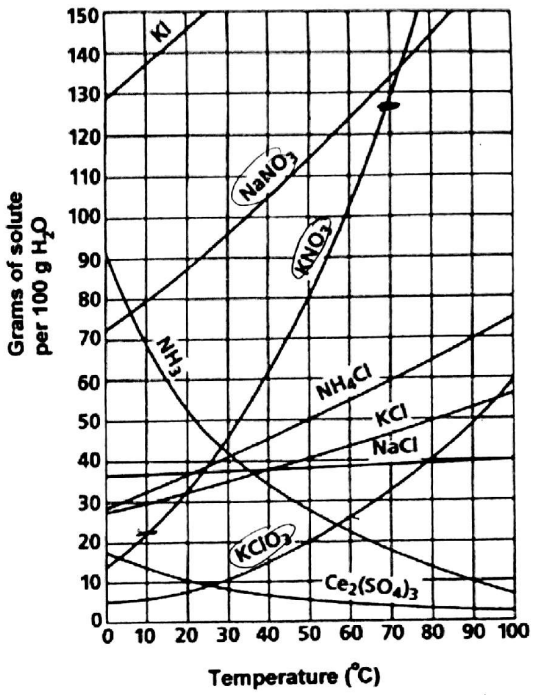
_____12. Which of the following is NOT a way to describe a concentration?
A. molality B. percent mass C. temperature D. molarity

_____13. Which of the following will have the largest dissociation factor?
A. LiCl
B. Na_2SO_4
C. CaO
D. NO_7

_____ 14. The bond between one water molecule to another water molecule is called a(n) ____ bond.
A. ionic B. covalent C. hydrogen D. metallic

_____ 15. Pouring salt onto bridges before an ice storm helps _____.
A. elevates the boiling point
B. depress the freezing point
C. elevates the freezing point
D. depress the boiling point

Solve the following problems using the solubility curve (4 pts).



16. A saturated solution of potassium nitrate dissolved in 100 mL of water is cooled from 70 degrees Celsius to 10 degrees Celsius. How many grams of potassium nitrate will be precipitated out of the solution as it cools?

17. At 50 degrees Celsius, how much ammonium chloride will dissolve in 300 g of water? $\frac{50}{100} = \frac{\quad}{300}$

18. How many grams of potassium chlorate must be added to 100 mL of water in order to have a saturated solution of potassium chlorate at 60 degrees Celsius?

19. If 285 grams of sodium nitrate are put into 100 grams of water at 40 degrees Celsius and stirred, will the solution be saturated, supersaturated, and unsaturated?

20. Which substance is **least** soluble at 90 degrees Celsius?

Problems: Show all work as directed INCLUDING UNITS!!!!!!! (8 pts.)

21. What is the molarity of a solution made by dissolving 65.0 g of zinc nitrate, $Zn(NO_3)_2$, in enough water to make 350.0 mL of solution?

22. 100 mL of a 1.0 M solution of sodium chloride is diluted to make a 0.25 M solution. How much water needs to be added to make this solution?

23. How many moles are needed to produce 1.2 m of KCl in 1560 grams of water?

24. What mass (in grams) of water must be used to make an 8.35% solution of KNO_3, if 65.0 g of KNO_3 is used?

25. What is the percent mass of a solution containing 15.0 grams of sodium chloride in 400 grams of water?

26. Calculate the new molarity if 100 mL of a 12.5 M HCl is diluted to a volume of 0.545 L.