Name: _____ Class: _____ Date: _____ ID: A

Ch 16 Practice test

Matching
You need your own calculator for the test.
I will not answer any questions about this test after tutorials on the first day the test is given.

Match each item with the correct statement below.

a. Henry's law
b. immiscible
c. saturated solution
d. supersaturated solution
e. concentration

____ 1. describes liquids that are insoluble in one another

____ 2. solution containing maximum amount of solute

____ 3. solution containing more solute than can theoretically dissolve at a given temperature

____ 4. At a given temperature, the solubility of a gas in a liquid is directly proportional to the pressure of the gas above the liquid.

____ 5. measure of the amount of solute dissolved in a specified quantity of solvent

Match each item with the correct statement below.

a. molarity
b. dilutions
c. Henry’s law
d. solute
e. solvent

____ 6. number of moles of solute dissolved in 1 L of solution

____ 7. reduces the number of moles per solution

____ 8. directly proportional

____ 9. solid substance

____ 10. a liquid

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 11. Which of the following usually makes a substance dissolve faster in a solvent?
a. agitating the solution
b. increasing the particle size of the solute
c. lowering the temperature
d. decreasing the number of particles

____ 12. Which of the following pairs of factors affects the solubility of a particular substance?
a. temperature and the nature of solute and solvent
b. temperature and degree of mixing
c. particle size and degree of mixing
d. particle size and temperature

____ 13. The solubility of a gas in a liquid is ____.
a. proportional to the square root of the pressure of the gas above the liquid
b. directly proportional to the pressure of the gas above the liquid
c. inversely proportional to the pressure of the gas above the liquid
d. unrelated to the pressure of the gas above the liquid

____ 14. What happens to the solubility of a gas, in a liquid, if the partial pressure of the gas above the liquid decreases?
a. The solubility decreases.
b. The solubility increases.
c. The solubility remains the same.
d. The solubility cannot be determined.

____ 15. If the solubility of a gas in water is 4.0 g/L when the pressure of the gas above the water is 3.0 atm, what is the pressure of the gas above the water when the solubility of the gas is 1.0 g/L?
a. 0.75 atm
b. 1.3 atm
c. 4.0 atm
d. 12 atm

____ 16. In a concentrated solution there is ____.
a. no solvent
b. a large amount of solute
c. a small amount of solute
d. no solute

____ 17. What is the molarity of a solution that contains 6 moles of solute in 2 liters of solution?
a. 6*M*
b. 12*M*
c. 7*M*
d. 3*M*

____ 18. In which of the following is the solution concentration expressed in terms of molarity?
a. $\frac{10\text{ g of solute}}{1000\text{ g of solution}}$
b. $\frac{10\text{ g of solute}}{1000\text{ mL of solution}}$
c. $\frac{10\text{ mL of solute}}{1\text{ L of solution}}$
d. $\frac{10\text{ mol of solute}}{1\text{ L of solution}}$

____ 19. Which of the following operations yields the number of moles of solute?
a. molarity × moles of solution
b. molarity × liters of solution
c. molarity × mass of solution
d. moles of solution ÷ volume of solution

____ 20. What is the molarity of 200 mL of solution in which 2.0 moles of sodium bromide is dissolved?
a. 2.0*M*
b. 10*M*
c. 0.40*M*
d. 4.0*M*

____ 21. What is the number of moles of solute in 250 mL of a 0.4*M* solution?
a. 0.1 mol
b. 0.16 mol
c. 0.62 mol
d. 1.6 mol

____ 22. What mass of sucrose, $C_{12}H_{22}O_{11}$, is needed to make 500.0 mL of a 0.200*M* solution?
a. 34.2 g
b. 100 g
c. 17.1 g
d. 68.4 g

____ 23. What mass of Na_2SO_4 is needed to make 2.5 L of 2.0*M* solution? (Na = 23 g; S = 32 g; O = 16 g)
a. 178 g
b. 284 g
c. 356 g
d. 710 g

____ 24. What does NOT change when a solution is diluted by the addition of solvent?
a. volume of solvent
b. mass of solvent
c. number of moles of solute
d. molarity of solution

____ 25. How many mL of a 2.0*M* NaBr solution are needed to make 200.0 mL of 0.50*M* NaBr?
a. 25 mL
b. 50 mL
c. 100 mL
d. 150 mL

____ 26. If 2.0 mL of 6.0*M* HCl is used to make a 500.0-mL aqueous solution, what is the molarity of the dilute solution?
a. 0.024*M*
b. 0.24*M*
c. 0.30*M*
d. 0.83*M*

____ 27. To 225 mL of a 0.80*M* solution of KI, a student adds enough water to make 1.0 L of a more dilute KI solution. What is the molarity of the new solution?
a. 180*M*
b. 2.8*M*
c. 0.35*M*
d. 0.18*M*

Short Answer

28. If the solubility of a gas is 7.5 g/L at 404 kPa pressure, what is the solubility of the gas when the pressure is 202 kPa?

29. How many liters of a 0.30*M* solution are needed to give 2.7 moles of solute?

30. What is the molarity of a solution containing 9.0 moles of solute in 2500 mL of solution?

31. What is the molarity of a solution containing 1.2 grams of solute in 450 mL of solution? (molar mass of solute = 24 g)

32. What is the number of moles of solute in 650 mL of a 0.40*M* solution?

33. How many liters of a 1.5*M* solution are required to yield 5.0 grams of solute? (molar mass of solute = 30.0 g)

34. If 1.0 mL of 6.0*M* HCl is added to 499 mL of water to give exactly a 500-mL solution, what is the molarity of the dilute solution?

Ch 16 Practice test
Answer Section

MATCHING

1. ANS: B PTS: 1 DIF: L1 REF: p. 473
   OBJ: 16.1.2 STA: Ch.6
2. ANS: C PTS: 1 DIF: L1 REF: p. 473
   OBJ: 16.1.3 STA: Ch.6
3. ANS: D PTS: 1 DIF: L1 REF: p. 474
   OBJ: 16.1.3 STA: Ch.6.c
4. ANS: A PTS: 1 DIF: L1 REF: p. 476
   OBJ: 16.1.3 STA: Ch.6.c
5. ANS: E PTS: 1 DIF: L1 REF: p. 480 | p. 481
   OBJ: 16.2.1 STA: Ch.6.d
6. ANS: A PTS: 1 DIF: L1 REF: p. 481 | p. 482
   OBJ: 16.2.1 STA: Ch.6.d
7. ANS: B PTS: 1 DIF: L1 REF: p. 488 | p. 489
   OBJ: 16.3.1 STA: Ch.6.e
8. ANS: C PTS: 1 DIF: L1 REF: p. 487 | p. 490
   OBJ: 16.3.1 STA: Ch.6.e
9. ANS: D PTS: 1
10. ANS: E PTS: 1

MULTIPLE CHOICE

11. ANS: A PTS: 1 DIF: L2 REF: p. 471 | p. 472
    OBJ: 16.1.1 STA: Ch.6.b
12. ANS: A PTS: 1 DIF: L2 REF: p. 473 | p. 474
    OBJ: 16.1.3 STA: Ch.6.c
13. ANS: B PTS: 1 DIF: L2 REF: p. 476
    OBJ: 16.1.3 STA: Ch.6.c
14. ANS: A PTS: 1 DIF: L1 REF: p. 476 | p. 477
    OBJ: 16.1.4 STA: Ch.6.c
15. ANS: A PTS: 1 DIF: L3 REF: p. 476 | p. 477
    OBJ: 16.1.4 STA: Ch.6.c
16. ANS: B PTS: 1 DIF: L1 REF: p. 480
    OBJ: 16.2.1 STA: Ch.6.d
17. ANS: D PTS: 1 DIF: L1 REF: p. 481
    OBJ: 16.2.1 STA: Ch.6.d
18. ANS: D PTS: 1 DIF: L1 REF: p. 480 | p. 481
    OBJ: 16.2.1 STA: Ch.6.d
19. ANS: B PTS: 1 DIF: L2 REF: p. 480
    OBJ: 16.2.1 STA: Ch.6.d
20. ANS: B PTS: 1 DIF: L2 REF: p. 481
    OBJ: 16.2.1 STA: Ch.6.d

21. ANS: A PTS: 1 DIF: L2 REF: p. 480 | p. 482
OBJ: 16.2.1 STA: Ch.6.d
22. ANS: A PTS: 1 DIF: L3 REF: p. 481 | p. 482
OBJ: 16.2.1 STA: Ch.6.d
23. ANS: D PTS: 1 DIF: L3 REF: p. 481 | p. 482
OBJ: 16.2.1 STA: Ch.6.d
24. ANS: C PTS: 1 DIF: L1 REF: p. 483
OBJ: 16.2.2 STA: Ch.6.d
25. ANS: B PTS: 1 DIF: L2 REF: p. 483 | p. 484
OBJ: 16.2.2 STA: Ch.6.d
26. ANS: A PTS: 1 DIF: L2 REF: p. 483 | p. 484
OBJ: 16.2.2 STA: Ch.6.d
27. ANS: D PTS: 1 DIF: L3 REF: p. 483 | p. 484
OBJ: 16.2.2 STA: Ch.6.d

SHORT ANSWER

28. ANS:

$$S_2 = \frac{S_1 \times P_2}{P_1} = \frac{7.5\text{g/L} \times 202\,\text{kPa}}{404\,\text{kPa}} = 3.8\ \text{g/L}$$

PTS: 1 DIF: L2 REF: p. 476 | p. 477
OBJ: 16.1.4 STA: Ch.6.c
29. ANS:

$$2.7\ \text{mol} \times \frac{1\text{L}}{0.30\ \text{mol}} = 9.0\ \text{L}$$

PTS: 1 DIF: L1 REF: p. 480 OBJ: 16.2.1
STA: Ch.6.d
30. ANS:

$$\frac{9.0\,\text{mol}}{2500\,\text{mL}} \times \frac{1000\,\text{mL}}{1\,\text{L}} = 3.6\,\text{mol/L}$$

PTS: 1 DIF: L2 REF: p. 480 | p. 481
OBJ: 16.2.1 STA: Ch.6.d
31. ANS:

$$\frac{1.2\,\text{g}}{450\,\text{mL}} \times \frac{1\,\text{mol}}{24\,\text{g}} \times \frac{1000\,\text{L}}{1\,\text{L}} = 0.11M$$

PTS: 1 DIF: L2 REF: p. 480 | p. 481
OBJ: 16.2.1 STA: Ch.6.d
32. ANS:

$$650\,\text{mL} \times \frac{0.4\,\text{mol}}{1000\,\text{mL}} = 0.26\,\text{mol}$$

PTS: 1 DIF: L2 REF: p. 480 | p. 482
OBJ: 16.2.1 STA: Ch.6.d

33. ANS:

$$\frac{1\,\text{L}}{1.5\,\text{mol}} \times \frac{1\,\text{mol}}{30.0\,\text{g}} \times 5.0\,\text{g} = 0.11\,\text{L}$$

PTS: 1 DIF: L3 REF: p. 480 | p. 481
OBJ: 16.2.1 STA: Ch.6.d

34. ANS:

$$\text{M}_2 = \frac{\text{M}_1 \times \text{V}_1}{\text{V}_2} = 6.0M \times \frac{1.0\,\text{mL}}{500\,\text{mL}} = 0.012M$$

PTS: 1 DIF: L2 REF: p. 483 | p. 484
OBJ: 16.2.2 STA: Ch.6.d