1. 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 (3) 0.500
   (2) 2.00 (4) 4.00

2. As additional $KNO_3(s)$ is added to a saturated solution of KNO_3 at constant temperature, the concentration of the solution
   (1) decreases (3) remains the same
   (2) increases

3. What is the molarity of a solution that contains 30. grams of NaOH in 500. milliliters of solution?
   (1) 1.5 M (3) 0.75 M
   (2) 2.6 M (4) 1.3 M

4. One hundred grams of water is saturated with NH_4Cl at 50°C. According to Table *G*, if the temperature is lowered to 10°C, what is the total amount of NH_4Cl that will precipitate?
   (1) 30. g (3) 5.0 g
   (2) 50. g (4) 17 g

5. 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?
   (1) 84 g (3) 42 g
   (2) 58 g (4) 38 g

6. Which of the following compounds is *least* soluble in water?
   (1) copper (II) chloride (3) iron (III) hydroxide
   (2) aluminum acetate (4) potassium sulfate

7. A solution is formed by dissolving 45 grams of NH_4Cl in 100 grams of H_2O at 70°C. Which statement correctly describes this solution?
   (1) NH_4Cl is the solute, and the solution is unsaturated.
   (2) NH_4Cl is the solute, and the solution is saturated.
   (3) NH_4Cl is the solvent, and the solution is unsaturated.
   (4) NH_4Cl is the solvent, and the solution is saturated.

8. At which temperature can water contain the most dissolved oxygen at a pressure of 1 atmosphere?
   (1) 10.°C (3) 30.°C
   (2) 20.°C (4) 40.°C

9. A solution contains 130 grams of KNO_3 dissolved in 100 grams of water. When 3 more grams of KNO_3 is added, none of it dissolves, nor do any additional crystals appear. The temperature of the solution is closest to
   (1) 72°C (3) 68°C
   (2) 70°C (4) 65°C

10. Based on Reference Table G, which of the following substances is most soluble at 60°C?
    (1) KCl (3) NH_3
    (2) NH_4Cl (4) NaCl

11. A 1 molal solution of $MgCl_2$ has a higher boiling point than a 1 molal solution of
    (1) $FeCl_3$ (3) $BaCl_2$
    (2) $CaCl_2$ (4) NaCl

12. A solution containing 60. grams of $NaNO_3$ completely dissolved in 50. grams of water at 50°C is classified as being
    (1) dilute and saturated (3) supersaturated
    (2) dilute and unsaturated (4) saturated

13. A change in pressure would have the greatest effect on the solubility of a
    (1) liquid in a liquid (3) solid in a liquid
    (2) liquid in a solid (4) gas in a liquid

14. When $PbI_2(s)$ is added to $Na_2CO_3(aq)$, a white precipitate is formed. According to Reference Table F, the white precipitate most likely is
    (1) Na_2CO_3 (3) $PbCO_3$
    (2) NaI (4) KNO_3

15. When an equilibrium exists between the dissolved and the undissolved solute in a solution, the solution must be
    (1) saturated (3) unsaturated
    (2) diluted (4) supersaturated

16. What is the concentration expressed in in parts per million of a solution containing 15.0 grams KNO_3 in 65.0 grams H_2O?
    (1) 2.00×10^5 ppm (3) 5.33×10^6 ppm
    (2) 1.88×10^5 ppm (4) 2.31×10^5 ppm

17. Based on Reference Table G, which salt solution could contain 42 grams of solute per 100 grams of water at 40°C?
    (1) a saturated solution of KCl
    (2) a saturated solution of $KClO_3$
    (3) an unsaturated solution of NH_4Cl
    (4) an unsaturated solution of NaCl

18. According to Reference Table F, which compound is most soluble?
(1) $PbCl_2$ (3) $CaCl_2$
(2) AgBr (4) AgI

19. Which salt has the greatest change in solubility between 30°C and 50°C?
(1) NaCl (3) KCl
(2) $NaNO_3$ (4) KNO_3

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?
(1) 100. (3) 120.
(2) 110. (4) 130.

21. Based on Reference Table G, what change will cause the solubility of $KNO_3(s)$ to increase?
(1) increasing the pressure (3) increasing the temperature
(2) decreasing the pressure (4) decreasing the temperature

22. Based on Reference Table *F*, which of the following saturated solutions would be the *least* concentrated?
(1) copper (II) sulfate (3) sodium sulfate
(2) barium sulfate (4) potassium sulfate

23. Given the reaction:

$$Fe(s) + 2HCl(aq) \rightarrow FeCl_2(aq) + H_2(g)$$

In this reaction, 5 grams of powdered iron will react faster than a 1-gram piece of solid iron because the powdered iron
(1) has less surface area (3) is less dense
(2) has more surface area (4) is more dense

24. What is the total number of moles of solute contained in 0.50 liter of 3.0 M HCl?
(1) 1.0 (3) 3.0
(2) 1.5 (4) 3.5

25. As the temperature increases from 0°C to 25°C the amount of NH_3 that can be dissolved in 100 grams of water
(1) decreases by 40 grams (3) increases by 40 grams
(2) decreases by 10 grams (4) increases by 10 grams

26. Based on Reference Table G, 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) 40 (3) 80
(2) 45 (4) 95

27. How many grams of KNO_3 are needed to be dissolved in water to make 500.0 grams of a 20.0 ppm solution?
(1) 1.00×10^{-4} g (3) 1.00×10^{-2} g
(2) 1.00×10^{-3} g (4) 1.00×10^{-1} g

28. A gas is most soluble in a liquid under conditions of
(1) low temperature and low pressure
(2) low temperature and high pressure
(3) high temperature and low pressure
(4) high temperature and high pressure

29. The attraction between water molecules and an Na^+ ion or a Cl^- ion occurs because water molecules are
(1) nonpolar (3) symmetrical
(2) polar (4) linear

30. What is the total number of grams of KCl (formula mass = 74.6) in 1.00 liter of 0.200 molar solution?
(1) 29.8 g (3) 14.9 g
(2) 22.4 g (4) 7.46 g

1) 2
2) 3
3) 1
4) 4
5) 1
6) 3
7) 1
8) 1
9) 3
10) 3
11) 4
12) 3
13) 4
14) 3
15) 1
16) 2
17) 3
18) 3
19) 4
20) 2

21) 3
22) 2
23) 2
24) 2
25) 1
26) 4
27) 3 $20.0\,ppm = \frac{x\,g\ KNO_3}{500.0\,g} \times 1 \times 10^6 = .01\,g$
28) 2
29) 2
30) 3