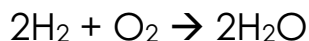Name: _____

Physical Science Unit 6 Practice Sheet

Chapter 7:

1. Label the product(s), reactant(s), subscripts, and coefficients in the reaction below:

$$2H_2 + O_2 \rightarrow 2H_2O$$

Balance the following equations and list the <u>type</u> of reaction for each.

Type of Reaction

2. ___Mg + ___HCl → ___MgCl$_2$ + ___H$_2$ _____

3. ___KClO$_3$ → ___KCl + ___O$_2$ _____

4. ___Al + ___O$_2$ → ___Al$_2$O$_3$ _____

5. ___CH$_4$ + ___O$_2$ → ___CO$_2$ + ___H$_2$O   _____

6. ___KCl + ___Zn$_3$(PO$_4$)$_2$ → ___ZnCl$_2$ + ___K$_3$PO$_4$ _____

7. What is the law of conservation of mass?

8. If a reaction releases energy, then it is _____. If a reaction absorbs energy, then it is _____.

9. What is conserved during a chemical reaction?

10.   A student is doing the reaction below in lab. He mixes 75 g of N$_2$ with 16 g of H$_2$, how many grams of NH$_3$ will be produced?

11. When balancing a chemical equation, which of the following can be changed?
   a. the subscripts
   b. the coefficients
   c. the formulas
   d. the mass

12. Chemical equations should be balanced so that they demonstrate the law of conservation of mass. Which of the following statements about balanced chemical equations is correct?
   a. The products must contain the same numbers and types of atoms as the reactants.
   b. The products must contain the same arrangement of atoms as found in the reactants.
   c. The products must contain the same numbers but not the same types of atoms as the reactants.
   d. The products must contain the same types but not the same numbers of atoms as the reactants.

13. What is true of a match burned in a closed system?
   a. The total mass of the system will be less because the flame consumed some of the mass.
   b. The chemical reaction will destroy some of the mass.
   c. The mass of the ashes will be greater than the mass of the match.
   d. The total mass of the system will be the same because the atoms were only rearranged.

14. This is a _____ reaction and the products are _____.
$$Zn + HCl \rightarrow ZnCl_2 + H_2$$
   a. single replacement; $ZnCl_2$ and H_2
   b. decomposition; $ZnCl_2$ and H_2
   c. synthesis; Zn and HCl
   d. double displacement; Zn and HCl

15. Which of the following is a balanced equation?
   a. $LiCl + 2H_2O \rightarrow 2HCl + Li_2O$
   b. $2KBr + 2CaO \rightarrow K_2O + CaBr_2$
   c. $Na_2S + 2KCl \rightarrow 2NaCl + K_2S$
   d. $NaCl + H_2O \rightarrow NaO + 2HCl$

Chapter 8:

16. What is the difference between a solute and a solvent?
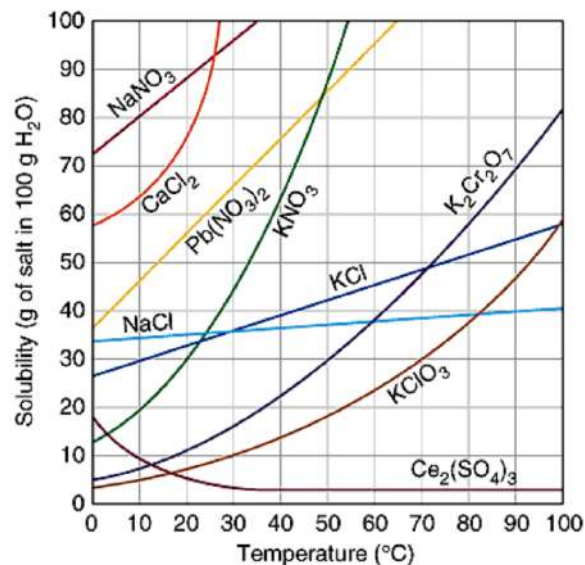
17. How does the solubility of a solid solute generally change as temperature increases?

18. Which substance has a decrease in solubility as the temperature increases?

19. How many grams of $CaCl_2$ will dissolve in 100 grams of water at 10∘C?

20. At which temperature can 30 grams of $KClO_3$ be dissolved in 100 grams of water?

21. How would you classify a solution that contains 35 grams of NaCl in 100 grams of water at 30∘C?
    a. unsaturated   b. saturated   c. supersaturated

22. How would you classify a solution that contains 70 grams of $NaNO_3$ in 100 g of water at 20∘C?
    a. unsaturated   b. saturated   c. supersaturated

23. If a solution containing 45 grams of KCl is heated from 60∘C to 80∘C, it would go from a _____ solution to a _____ solution.
    a. unsaturated, saturated   c. supersaturated, saturated
    b. saturated, unsaturated   d. saturated, supersaturated

24. A gas becomes more soluble in a liquid at _____ temperatures and _____ pressures.

25. Which factor explains why a cube of sugar placed in water will dissolve at a slower rate than granular sugar over time?
    a. The mass of the cube decreases.
    b. The cube has a smaller surface area.
    c. The temperature of the cube decreases.
    d. The particles in the cube have more movement.

26. What is the characteristic ion of a base?
    a. hydroxide ion (OH^-)   c. hydrogen ion (H^+)
    b. phosphate ion (PO_4^{3-})   d. carbonate ion (CO_3^{2-})

27. Mathieu conducted an experiment and noticed that there was a high concentration of OH^- ions in solution. What is the MOST LIKELY pH of this solution?
    a. 2   b. 5   c. 7   d. 9

28. Which of the following variables has the LEAST effect on the rate a substance dissolves in a container of water?
    a. the force of the stirring
    b. the size of the container
    c. the temperature of the water
    d. the surface area of the substance

29. Courtney wants to test an unknown chemical solution. What test should Courtney perform to determine whether the chemical is an acid or base?
    a. Test the solution by increasing its temperature.
    b. Test the solution by calculating its density.
    c. Test the solution by tasting it.
    d. Test the solution's pH by using litmus paper.

30. A soil sample with a pH of 4.5 is
    a. neutral.   c. basic.
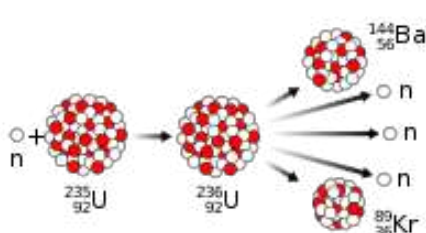   b. acidic.   d. inconclusive.

*Chapter 10:

31. What is the difference in fusion and fission?

32. The half-life of radon-222 is 3.8 days. How much of a 100 g sample is left after 15.2 days?

33. Carbon-14 has a half-life of 5,730 years. If a sample contains 70 mg originally, how much is left after 17,190 years?

34. How much of a 500 g sample of potassium-42 is left after 62 hours? The half-life of K-42 is 12.4 hours.

35. The half-life of cobalt-60 is 5.26 years. If 50 g are left after 15.8 years, how many grams were in the original sample?

36. The half-life of I-131 is 8.07 days. If 25 g are left after 40.35 days, how many grams were in the original sample?

37. If 100 g of Au-198 decays to 6.25 g in 10.8 days, what is the half-life of Au-198?

38. How many half-lives does it take a radioactive substance to decay until only one-eighth of the original substance remains?
    a. two   b. three   c. six   d. eight

39. Which statement correctly describes this type of reaction and the overall energy change that occurs?

    a. The reaction is fission, and energy is absorbed.
   b. The reaction is fusion, and energy is released.
    c. The reaction is fusion, and energy is absorbed.
    d. The reaction is fission, and energy is released.

40. Which statement BEST describes a risk associated with using radioisotopes in nuclear reactors?
    a. If the radiation were to leak out of the reactors, it could produce an abundance of new plants and organisms.
    b. If the radiation were to leak out of the reactors, it could cause significant damage to living organisms.
    c. Radioisotopes are very expensive and do not produce the amount of energy that coal and oil produce.
   d. Radioisotopes are extremely difficult to obtain and can only be retrieved from the Sun.

41. Which is an advantage of using nuclear energy as a power source?
   a. The products created by a nuclear reaction are safe and reusable.
   b. There are additional nutrients provided to plant life from the nuclear waste.
   c. There is a large amount of energy produced from a small amount of uranium.
   d. The power plants are inexpensive to build and produce large amounts of energy.

42. Which statement BEST describes this type of reaction and the overall energy change that occurs?

   a. The reaction is fission, and energy is absorbed.
   b. The reaction is fusion, and energy is released.
   c. The reaction is fusion, and energy is absorbed.
   d. The reaction is fission, and energy is released.

   ^2H ^3H
   ^4He + 3.5 MeV
   n + 14.1 MeV
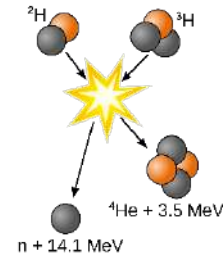
43. What is the biggest disadvantage of using nuclear power to produce electricity?
   a. Nuclear fission released more air pollution than burning coal.
   b. Nuclear fission produces less energy than burning coal or oil.
   c. Nuclear waste must be safely stored for many years.
   d. Nuclear waste must be incinerated.

Use the half-life graph to answer the following questions.
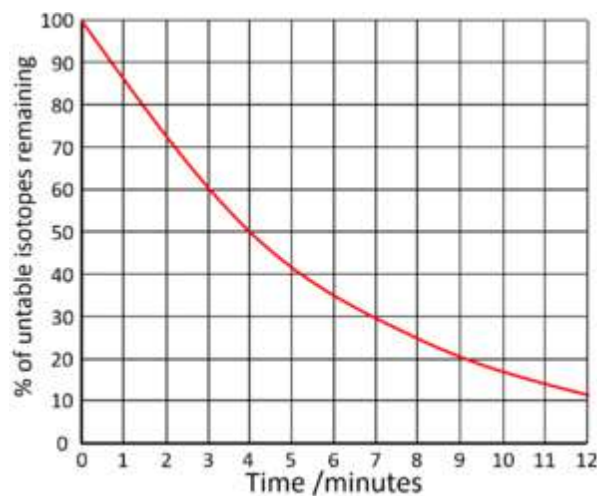
44. What is the half-life of the radioisotope in the graph above?

45. How much of the radioisotope above is still present after 2 half-lives?