# 2TQ: Atoms, Molecules, and Ions Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# *Text Questions from Brown, et. al.*

2.1

1. Among the Greeks, \_\_\_\_\_\_\_\_\_\_\_\_\_ believed in the idea of indivisible particles, or atoms. \_\_\_\_\_\_\_ and

\_\_\_\_\_\_\_\_\_\_\_ advanced the idea that there were no ultimately indivisible particles. The atomic view of

matter was ignored while \_\_\_\_\_\_\_\_\_\_\_\_\_\_ philosophy dominated \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_.

2. What were two of the known scientific laws that Dalton’s theory explained?

2.2

3. Did Dalton and those who immediately followed him have direct evidence for the existence of atoms?

4. What evidence was there for cathode rays being negatively-charged particles?

5. With his \_\_\_\_-\_\_\_\_\_\_ experiment, \_\_\_\_\_\_\_\_\_ first found the \_\_\_\_\_\_\_ of the electron, which has a value

of \_\_\_\_\_\_\_\_\_\_\_\_. He then used the charge-to-mass ratio – earlier found by \_\_\_\_\_\_\_\_\_ – to calculate the electron’s \_\_\_\_\_\_\_.

6. Make a table in which you list: a) the symbol for

the type of radiation, b) whether it consists of

particles or rays, and c) the charge it carries.

7. \_\_\_\_\_\_\_\_\_\_ proposed that the positive and negative particles of the atoms were closely intermingled, in

what he called the \_\_\_\_-\_\_\_\_\_\_\_\_\_ model. \_\_\_\_\_\_\_\_\_\_\_\_\_, after his experiments using a thin \_\_\_\_\_

\_\_\_\_\_\_, proposed that all an atom’s positive particles were at the center of the atom – called the

\_\_\_\_\_\_\_\_\_\_ – with the negatives around the outside. Later, \_\_\_\_\_\_\_\_\_\_ discovered the existence of

neutrally-charged \_\_\_\_\_\_\_\_\_\_\_\_.

2.3

8. Why do chemists take a relatively simple view of the atom?

9. Why does every atom have no net electrical charge?

10. One angstrom is equal to what?

11. How big would a hydrogen atom’s nucleus be, if the whole atom were the size of a football stadium?

12. What is the difference between the atomic number and the mass number?

13. Why is the subscript often omitted in, for example, the notation 12C?

2.4

14. Write the two equivalence statements between atomic mass units and grams.

15. To calculate the average atomic mass of an element, what two kinds of information do we need?

2.5

16. Which organization has proposed that the groups on the Periodic Table be numbered 1 through 18?

2.6

17. Only which elements are normally found in nature as isolated atoms?

18. What is a molecule?

19. When we speak of any of the diatomic elements – oxygen, for example – we mean \_\_\_\_\_ unless…

20. Most molecular substances we will encounter contain…

21. What is the difference between a molecular and an empirical formula?

22. For many substances, as with water (H2O), the empirical and molecular formulas…

23. Why do chemists bother with empirical formulas?

24. What does a structural formula show, and what does it NOT show?

25. Draw the perspective drawing and the

ball-and-stick model for methane, CH4.

2.7

26. What happens to the nucleus during a chemical reaction?

27. In terms of electrons, how are: …cations formed? …anions formed?

28. In general, cations are \_\_\_\_\_\_\_\_ ions, whereas anions are \_\_\_\_\_\_\_\_\_\_\_ ions. Consequently, ionic

compounds are generally combinations of \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_.

29. Why are we able to write only empirical formulas for ionic compounds?

2.8

30. What two things are essential vocabulary in chemistry?

31. What are the three categories of inorganic compounds you will need to know how to name?

32. Cations formed from metal ions have…

33. If a metal can form different cations, what is used to indicate the charge? Also, give one example.

34. How is the Hg22+ ion unusual, and why is it called the mercury(I) ion?

35. What is done in naming monatomic anions? Also, give one example.

36. Polyatomic ions containing oxygen are called \_\_\_\_\_\_\_\_\_\_\_. The most common of these of an element

has the ending \_\_\_\_\_. If the ion has one MORE oxygen atom, the prefix \_\_\_\_\_ is used. If the ion has

one LESS oxygen atom, the ending \_\_\_\_\_ is used. For two fewer oxygen atoms than the “most

common” form, the prefix is \_\_\_\_\_\_ is used, along with the ending \_\_\_\_\_.

37. A. When one H is added to an oxyanion, one of what two prefixes should be added to the name?

B. What prefix should be added if two H’s are added to an oxyanion?

38. Names of ionic compounds consist of what two things?

# 39. If an acid has an anion ending with *–ide*, change the ending to \_\_\_\_ and put the prefix \_\_\_\_\_\_\_ in front.

# 40. Write the formula and name of the acid formed from each of the following anions:

# BrO4– (perbromate ion) BrO3– (bromate ion) BrO2– (bromite ion) BrO– (hypobromite ion)

41. A. When naming molecular compounds, what do Greek prefixes indicate?

B. What rule must be kept in mind for the prefix *mono*-?

42. Why do we name molecular compounds using prefixes that explicitly indicate their composition?

43. Why are molecular compounds containing hydrogen and one other element an exception to the typical nomenclature rule for molecular compounds?

2.9

44. What is organic chemistry?

45. What are hydrocarbons?

46. In alkanes, each carbon atom is bonded to how many other atoms?

47. List the prefixes from 1 to 10 that are used in organic nomenclature.

48. Alcohols have the \_\_\_\_\_ group and are named using the ending \_\_\_\_\_\_.

49. The number prefix on an alcohol’s name indicates what?