**Section 3.1 Study Guide: The Atom**

**Multiple Choice**

*Identify the choice that best completes the statement or answers the question.*

\_\_\_\_ 1. The law of definite proportions

|  |  |
| --- | --- |
| a. | contradicted Dalton's atomic theory. |
| b. | agrees with Dalton's atomic theory. |
| c. | replaced the law of conservation of mass. |
| d. | assumes that atoms of all elements are identical. |

\_\_\_\_ 2. According to Dalton's atomic theory, atoms

|  |  |
| --- | --- |
| a. | are destroyed in chemical reactions. |
| b. | can be divided. |
| c. | of each element are identical in size, mass, and other properties. |
| d. | of different elements cannot combine. |

\_\_\_\_ 3. Which of the following is *not* part of Dalton's atomic theory?

|  |  |
| --- | --- |
| a. | Atoms cannot be divided, created, or destroyed. |
| b. | The number of protons in an atom is its atomic number. |
| c. | In chemical reactions, atoms are combined, separated, or rearranged. |
| d. | All matter is composed of extremely small particles called atoms. |

\_\_\_\_ 4. Which of the following statements is true according to modern atomic theory?

|  |  |
| --- | --- |
| a. | Atoms of the same element may have different masses. |
| b. | Atoms may be divided in ordinary chemical reactions. |
| c. | Atoms can never combine with any other atoms. |
| d. | Cathode rays are composed of protons.. |

\_\_\_\_ 5. The atomic theory proposed by Dalton has been

|  |  |
| --- | --- |
| a. | totally discarded. |
| b. | expanded and modified. |
| c. | accepted unchanged to the present day. |
| d. | found to be plagiarized. |

**Completion**

*Complete each statement.*

6. If a particular compound is composed of elements A and B, the ratio of the mass of B to the mass of A will always be the same. This is a statement of the law of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

7. If two or more compounds are composed of elements A and B, the ratio of the masses of B combined with 1 g of A is always a ratio of small whole numbers. This is a statement of the law of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

8. Dalton’s theory agreed with the modern atomic theory in almost all cases. List the two statements that were later found to be in error. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. Dalton Incorporated the law of conservation of mass into his atomic theory by asserting that atoms are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

10. the principles of atomic theory recognized today were conceived by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

11. If a particular compound is composed of elements A and B, the ration of the mass of B to the mass of A will always the same. This is a statement of the law of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Matching**

Match each of the following laws.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | definite proportions | c. | conservation of mass |
| b. | multiple proportions |

\_\_\_\_ 12. Dalton stated that atoms were indivisible.

\_\_\_\_ 13. When hydrogen and oxygen react to form a compound (product), the mass of the compound is equal to the sum of the masses of the individual elements (reactants).

\_\_\_\_ 14. Oxygen can combine with carbon to form two compounds, CO and CO2. The ratio of the masses of oxygen that combine with a given mass of carbon is 1:2.

\_\_\_\_ 15. In oxides of nitrogen, such as N2O, NO, NO2, and N2O3, atoms combine in small whole-number ratios.

\_\_\_\_ 16. Any two samples of KCl have the same ratio of elements.

**Numeric Response**

17. If each atom of element **D** has 3 mass units and each atom of element **E** has 5 mass units, a molecule composed of one atom each of **D** and **E** has \_\_\_\_\_\_\_\_\_\_ mass units.

18. If 4.0 g of element A combine with 10. g of element **B**, then 12 g of element **A** combines with \_\_\_\_\_\_\_\_\_g of element **B**.

19. If 6.0 g of element K combine with 17 g of element L, then \_\_\_\_\_\_\_\_\_\_ grams of element K combines with 85 g of element L.

20. If 63.5 g of copper (Cu) combine with 16 g of oxygen (O) to form the compound CuO, then \_\_\_\_\_\_\_\_\_\_ grams of oxygen will be needed to combine with the same amount of copper to form the compound CuO2.

21. The ratio of oxygen to carbon when 32 g of oxygen combine with 12 g of carbon is \_\_\_\_\_\_\_\_\_\_.

**Short Answer**

22. Describe the law of definite proportions.

23. What is the law of conservation of mass?

24. What is the law of multiple proportions?

25. State three of the main concepts in Dalton’s atomic theory.