Laws of chemical combination

1. Which of the following pairs of substances illustrate the law of multiple proportions

(a) CO and CO_2

(b) H_2O and D_2O

(c) $NaCl$ and $NaBr$

(d) MgO and $Mg(OH)_2$

2. 1.0 g of an oxide of A contained 0.5 g of A. 4.0 g of another oxide of A contained 1.6 g of A. The data indicate the law of

(a) Reciprocal proportions

(b) Constant proportions

(c) Conservation of energy

(d) Multiple proportions

3. Among the following pairs of compounds, the one that illustrates the law of multiple proportions is

(a) NH_3 and NCl_3

(b) H_2S and SO_2

(c) CuO and Cu_2O

(d) CS_2 and $FeSO_4$

4. The percentage of copper and oxygen in samples of CuO obtained by different methods were found to be the same. This illustrates the law of

(a) Constant proportions

(b) Conservation of mass

(c) Multiple proportions

(d) Reciprocal proportions

5. Two samples of lead oxide were separately reduced to metallic lead by heating in a current of hydrogen. The weight of lead from one oxide was half the weight of lead obtained from the other oxide. The data illustrates

(a) Law of reciprocal proportions

(b) Law of constant proportions

(c) Law of multiple proportions

(d) Law of equivalent proportions

6. Chemical equation is balanced according to the law of

(a) Multiple proportion

(b) Reciprocal proportion

(c) Conservation of mass

(d) Definite proportions

7. Avogadro number is

(a) Number of atoms in one gram of element

(b)Number of millilitres which one mole of a gaseous substances occupies at NTP

(c) Number of molecules present in one gram molecular mass of a substance

(d) All of these

8. Different propartions of oxygen in the various oxides of nitrogen prove the

(a) Equivalent proportion

(b) Multiple proportion

(c) Constant proportion

(d) Conservation of matter

9. Two elements *X* and *Y* have atomic weights of 14 and 16. They form a series of compounds *A*, *B*, *C*, *D* and *E* in which the same amount of element *X*, *Y* is present in the ratio 1 : 2 : 3 : 4 : 5. If the compound *A* has 28 parts by weight of *X* and 16 parts by weight of *Y*, then the compound of *C* will have 28 parts weight of *X* and

(a) 32 parts by weight of *Y*

(b) 48 parts by weight of *Y*

(c) 64 parts by weight of *Y*

(d) 80 parts by weight of *Y*

10. Carbon and oxygen combine to form two oxides, carbon monoxide and carbon dioxide in which the ratio of the weights of carbon and oxygen is respectively 12 : 16 and 12 : 32. These figures illustrate the

(a) Law of multiple proportions

(b) Law of reciprocal proportions

(c) Law of conservation of mass

(d) Law of constant proportions

11. A sample of calcium carbonate ($CaCO_3$) has the following percentage composition : *Ca* = 40%; *C* = 12%; *O* = 48%

If the law of constant proportions is true, then the weight of calcium in 4 *g* of a sample of calcium carbonate obtained from another source will be

(a) 0.016 *g* (b) 0.16 *g*

(c) 1.6 *g* (d) 16 *g*

12. *n g* of substance *X* reacts with *m g* of substance *Y* to form *p g* of substance *R* and *q g* of substance *S*. This reaction can be represented as, $X + Y = R + S$. The relation which can be established in the amounts of the reactants and the products will be

(a) $n - m = p - q$

(b) $n + m = p + q$

(c) $n = m$

(d) $p = q$

13. Which of the following is the best example of law of conservation of mass

(a) 12 *g* of carbon combines with 32 *g* of oxygen to form 44 *g* of CO_2

(b) When 12 *g* of carbon is heated in a vacuum there is no change in mass

(c) A sample of air increases in volume when heated at constant pressure but its mass remains unaltered

(d) The weight of a piece of platinum is the same before and after heating in air

14. The law of multiple proportions is illustrated by the two compounds

(a) Sodium chloride and sodium bromide

(b) Ordinary water and heavy water

(c) Caustic soda and caustic potash

(d) Sulphur dioxide and sulphur trioxide

15. In compound *A*, 1.00 *g* nitrogen unites with 0.57 *g* oxygen. In compound *B*, 2.00 *g* nitrogen combines with 2.24 *g* oxygen. In compound *C*, 3.00 *g* nitrogen combines with 5.11 *g* oxygen. These results obey the following law

(a) Law of constant proportion

(b) Law of multiple proportion

(c) Law of reciprocal proportion

(d) Dalton's law of partial pressure

16. Hydrogen combines with oxygen to form H_2O in which 16 *g* of oxygen combine with 2 *g* of hydrogen. Hydrogen also combines with carbon to form CH_4 in which 2 *g* of hydrogen combine with 6 *g* of carbon. If carbon and oxygen combine together then they will do show in the ratio of

(a) 6 : 16 or 12 : 32 (b) 6 : 18

(c) 1 : 2 (d) 12 : 24

17. 2 *g* of hydrogen combine with 16 *g* of oxygen to form water and with 6 *g* of carbon to form methane. In carbon dioxide 12 *g* of carbon are combined with 32 *g* of oxygen. These figures illustrate the law of

(a) Multiple proportions

(b) Constant proportions

(c) Reciprocal proportions

(d) Conservation of mass

18. An element forms two oxides containing respectively 53.33 and 36.36 percent of oxygen. These figures illustrate the law of
(a) Conservation of mass
(b) Constant proportions
(c) Reciprocal proportions
(d) Multiple proportions

19. After a chemical reaction, the total mass of reactants and products
(a) Is always increased
(b) Is always decreased
(c) Is not changed
(d) Is always less or more

20. A sample of pure carbon dioxide, irrespective of its source contains 27.27% carbon and 72.73% oxygen. The data support
(a) Law of constant composition
(b) Law of conservation of mass
(c) Law of reciprocal proportions
(d) Law of multiple proportions

21. The law of definite proportions is not applicable to nitrogen oxide because
(a) Nitrogen atomic weight is not constant
(b) Nitrogen molecular weight is variable
(c) Nitrogen equivalent weight is variable
(d) Oxygen atomic weight is variable

22. Which one of the following pairs of compounds illustrates the law of multiple proportion
(a) H_2O, Na_2O
(b) MgO, Na_2O
(c) Na_2O, BaO
(d) $SnCl_2, SnCl_4$