1. Sodium carbonate reacts with ethanoic acid to form sodium ethanoate, carbon dioxide and water. In an experiment 5.3 g of sodium carbonate reacted with 6 g of ethanoic acid to form 8.2 g sodium ethanoate, 2.2 g of carbon dioxide and 0.9 g of water. Show that this data verifies the law of conservation of mass.

2. Calculate the mass of carbon present in 4g of carbon dioxide.

3. A 0.24 g sample of compound of oxygen and boron was found by analysis to contain 0.096 g of boron and 0.144 g of oxygen. Calculate the percent composition of the compound by mass.

4. Which postulate of Dalton's atomic theory is a result of the law of conservation of mass?

5. Which postulate of Dalton's atomic theory can explain the law of definite proportions?

6. Define the atomic mass unit?

7. What are polyatomic ions? Give examples.

8. Hydrogen and oxygen combine in the ratio 1 : 8 by mass to form water. What weight of oxygen gas would be required to react completely with 3 g of hydrogen gas ?

9. Give the names of the elements present in the following compounds :

   (a) Quick lime   (b)   Hydrogen bromide

   (c) Baking powder   (d)   Potassium sulphate

10. When 3.0 g of carbon is burnt in 8.00 g oxygen, 11.00 g of carbon dioxide is produced. What mass of carbon dioxide will be formed when 3.00 g of carbon is burnt in 50.00 g of oxygen? Which law of chemical combination will govern your answer?

11. Write the postulates of Dalton's atomic theory.

12. State and explain the following.

    (i) Atom (ii) Molecule (iii) Cation (iv) Anion (v) Atomic Mass unit.

13. Calculate the molar mass of the following substances :

    (a) Ethyne, C_2H_2 (b) Sulphur molecule, S_8

    (c) Phosphorus molecule, P_4(Atomic mass of phosphorus = 31)

    (d) Hydrochloric acid, HCl   (e) nitric acid, HNO_3

14. Calculate the formula unit mass of $Na_2SO_4.10H_2O$ Atomic masses Na = 23.0u, S = 32.0u, O = 16.0u, H = 1.0u.

15. Calcium salt of a hypothetical anion Z has the molecular formula Ca_3Z_2. What is the valency of Z and what would be the molecular formula of aluminium salt of Z?

16. The valency of potassium is +1. Write the molecular formulae for potassium dichromate and potassium permanganate.

17. Calculate the formula unit mass of $CaCl_2$.

18. What is the mass of :

    (a) 1 mole of nitrogen atoms.

    (b) 4 moles of aluminium atoms (Atomic mass of aluminium = 27) ?

19. Calculate the number of moles in 5.75 g of sodium (Atomic mass of sodium   = 23.0 u)

20. Calculate the mass of 5 mol of ammonia ?

21. The mass of single atom of an element M is 3.15×10^{-23} g. What is its atomic mass ? What could the element be ?

22. If one mole of carbon atoms weight 12 gram, what is the mass in gram of 1 atom of carbon ?

23. Write down the formulae of (i) aluminium oxide (ii) aluminium chloride (iii) hydrogen sulphide (iv) calcium hydroxide.

24. (a) Calculate the relative molecular mass of water (H_2O).

    (b) Calculate the molecular mass of HNO_3.

25. What is the mass of :

    (a) 0.2 mole of oxygen atoms?

    (b) 0.5 mole of water molecules?

26. Calculate the number of molecules of sulphur (S_8) present in 16 g of solid sulphur.

27. Calculate the formula unit mass of ZnO, Na_2O, K_2CO_3. Given atomic mass of Zn = 65 u, Na = 23 u, K = 39 u, C 12 u, O = 16 u, S = 32 u.

28. Calculate the number of particles in each of the following :

    (i)   46 g of Na atoms   (ii)   8 g of O_2 molecules

    (iii)   0.1 mole of carbon atoms

29. Calculate the mass of the following :

    (i) 0.5 mole of N_2 gas   (ii) 0.5 mole of N atoms

    (iii) 3.011×10^{23} N atoms   (iv) 6.022×10^{23} N_2 molecules.

30. Calculate the number of aluminium ions present in 0.051 g of aluminium oxide (Atomic mass of Al = 27 u).

31. Calculate the number of moles for the following :

    (i)   52 g of He   (ii) 12.044×10^{23} atoms of He

32. Which has more atoms, 100 gram of sodium or 100 gram of iron (given, atomic mass of Na = 23 u, Fe = 56 u).

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