THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

Atoms and Molecules

Grade IX

Question Bank

Answer the following questions

1. What is the law of conservation of mass? Who established it?

2. What is the law of constant proportion? Who established it?

3. In a reaction, 5.3 g of sodium carbonate reacted with 6 g of acetic acid. The products were 2.2 g of carbon dioxide, 0.9 g of water, and 8.2 g of sodium acetate. Show that these observations are in agreement with the law of conservation of mass.
   sodium carbonate + acetic acid → sodium acetate + carbon dioxide + water

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

5. What is Dalton's atomic theory?

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

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

8. What is the difference between atomic mass and relative mass?

9. Define the atomic mass unit.

10. What is a molecule?

11. What is an ion?

12. What is formula mass?

13. Write down the formulae of
    (i) sodium oxide
    (ii) aluminium chloride
    (iii) sodium suphide
    (iv) magnesium hydroxide

14. Write down the names of compounds represented by the following formulae:
    (i) $Al_2 (SO_4)_3$
    (ii) $CaCl_2$
    (iii) $K_2 SO_4$
    (iv) KNO_3
    (v) $CaCO_3$

15. What is meant by the term chemical formula?

16. How many atoms are present in a
    (i) H_2S molecule and
    (ii) PO_4^{3-} ion?

17. Calculate the molecular masses of H_2 , O_2 , Cl_2 , CO_2 , CH_4 , C_2H_6 , C_2H_4 , NH_3 , CH_3OH.

18. Calculate the formula unit masses of ZnO, Na_2O, K_2CO_3, given atomic masses of Zn = 65 u,
    Na = 23 u, K = 39 u, C = 12 u, and O = 16 u.

19. A 0.24 g sample of a compound of oxygen and boron was found by analysis to contain 0.096 g of boron and 0.144 g of oxygen. Calculate the percentage composition of the compound by weight.

20. When 3.0 g of carbon is burnt in 8.00 g of 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?\

21. What are polyatomic ions? Give examples.

22. Write the chemical formulae of the following.
    (a) Magnesium chloride
    (b) Calcium oxide
    (c) Copper nitrate
    (d) Aluminium chloride
    (e) Calcium carbonate.

23. Give the names of the elements present in the following compounds.
    (a) Quick lime
    (b) Hydrogen bromide
    (c) Baking powder
    (d) Potassium sulphate.

24. 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