



## CHEMISTRY

### BOOKS - SWAN PUBLICATION

### ATOMS AND MOLECULES

#### Question

1. In a reaction, 5.3 g of sodium carbonate reacted with 6 g of ethanoic acid. The products were 2.2 g of carbon dioxide, 0.9 g water and 8.2 g of sodium ethanoate. Show that these observations are in

agreement with the law of conservation of mass.

sodium carbonate + ethanoic acid  $\rightarrow$  sodium ethanoate + carbon dioxide + water



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2. Hydrogen and oxygen combine in the 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?



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

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4. Which postulate of Dalton's atomic theory can explain the law of definite proportion?

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5. Define the atomic mass unit?

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6. Why is not possible to see an atom with naked eyes?



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7. Write down the formula of sodium oxide



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8. Write down the formula of :Aluminium chloride



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9. Write down the formula of sodium sulphide



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10. Write down the formula of Magnesium hydroxide



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11. Write down the names of the compounds represented by the following formula:  $Al_2(SO_4)_3$

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12. Write down the name of the compounds represented by the following formulae.  $CaCl_2$

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13. Write down the names of the compounds represented by the following formula :  $K_2SO_4$

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14. Write down the names of the compounds represented by the following formula:  $KNO_3$

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15. Write down the names of the compounds represented by the following formula :  $CaCO_3$

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16. What is meant by the term chemical formula?

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17. How many atoms are present in a  $H_2S$  molecule



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18. How many atoms are present in,  $PO_4^{3-}$  ion?



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19. Calculate the molecular masses of

$H_2, O_2, Cl_2, CO_2, CH_4, C_2H_6, C_2H_4, NH_3, CH_3OH$

.



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20. 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

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21. If one mole of carbon atom weigh 12 grams. What is the mass ( in grams) of 1 atom of carbon?

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



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## Exercises

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



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2. 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 ?



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3. What are polyatomic ions ? Give examples.



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4. Write the chemical formula of the following  
:Magnesium chloride

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5. Write the chemical formula of the following  
:Calcium oxide

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6. Write the chemical formula of the following  
:Copper nitrate

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7. Write the chemical formula of the following

:Aluminium chloride



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8. Write the chemical formula of the following

:Calcium carbonate



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

(a) Quick lime (b) Hydrogen bromide

(c) Baking powder (d) Potassium sulphate



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10. Calculate the molar mass of the following substances : Ethyne  $C_2H_2$



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11. Calculate the molar mass of the following substances :Sulphur molecule, $S_8$



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12. Calculate the molar mass of the following substances :Phosphorus molecule, $P_4$  (Atomic mass of phosphorus is 31)



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13. Calculate the molar mass of the following substances :Hydrochloric acid, HCl

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14. Calculate the molar mass of the following substances : Nitric acid, $HNO_3$ .

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15. What is the mass of : 1 mole of nitrogen atoms  
?





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16. What is the mass of :) 4 moles of aluminium atoms (Atomic mass of aluminium = 27) ?



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17. What is the mass of : 10 moles of sodium sulphite ( $Na_2SO_3$ )?



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**18.** Convert into moles : 12g of oxygen gas



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**19.** Convert into moles : 20g of water



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**20.** Convert into moles : 22g of carbon dioxide



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21. What is the mass of : 0.2 mole of oxygen atoms?

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22. What is the mass of: 0.5 mole of water molecules?

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

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24. Calculate the number of aluminium ions present in 0.051 g of aluminium oxide



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## Important Q A

1. What is law of conservation of mass?



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2. State and explain law of definite proportions



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3. Differentiate between an atom and a molecule.



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4. Write the important postulates of the Dalton's Atomic Theory



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5. What is an ion ?



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6. Calculate the molar mass of the following and write in appropriate unit  $C_2H_5OH$ ,  $S_8$ ,  $PCl_5$ .



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7. Neon gas consists of single atoms, what mass of neon contain  $6.022 \times 10^{23}$  atoms.



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8. How many molecules are present in 9g of water ?

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9. How many molecules are present in

17g of ammonia

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10. Calculate the number of moles in 17 g of  $H_2O_2$ .

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**11.** Give symbols of the following elements:

Potassium, aluminium, cadmium, chlorine, uranium,  
gold, mercury, lead, tin and fluorine.



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**12.** Calculate the molecular mass of the following



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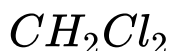


**13.** Calculate the molecular mass of the following  
(using atomic mass).



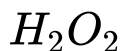
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**14.** Calculate the molecular mass of the following  
(using atomic mass).



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**15.** Calculate the molecular mass of the following  
(using atomic mass).



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**16.** Calculate the molecular mass of the following  
(using atomic mass).



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**17.** Calculate the molecular mass of the following  
(using atomic mass).

HCl



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**18.** Calculate the formula mass of the compounds  
whose formulae are given below :

MgO



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**19.** Calculate the formula mass of the compounds whose formulae are given below :



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**20.** Calculate the formula mass of the compounds whose formulae are given below :



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21. Calculate the formula mass of the compounds whose formulae are given below :



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22. Sodium carbonate ( $Na_2CO_3 \cdot 10H_2O$ ) is an important industrial chemical. Calculate its formula mass.



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23. What is the mass of : 1 mole of nitrogen atoms  
?



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24. What is the mass of :  
4 mole of Al atoms



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25. What is the mass of :  
1.50 mol of  $Na^+$  ions

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26. What is the mass of : 10 moles of sodium sulphite ( $Na_2SO_3$ )?

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27. A sample of ammonia ( $NH_3$ ) weighs 2.00g. What mass of sulphur dioxide ( $SO_2$ ) contains the same number of molecules as are in 2.00 g of ammonia ?

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