Empirical Formula ASSIGNMENT - 10

Some Basic Concepts of Chemistry

1. An organic compound contains 78% (by wt.) carbon and remaining percentage of hydrogen. The right option for the empirical formula of this compound is [At. wt. of C is 12, H is 1] **[NEET 2021]**

(a) CH (b) CH_2
(c) CH_3 (d) CH_4

Ans. *(c)*

2. An organic compound contains carbon, hydrogen and oxygen. Its elemental analysis gave C, 38.71% and H, 9.67%. The empirical formula of the compound would be **[CBSE AIPMT 2008]**

(a) CH_3O (b) CH_2O (c) CHO (d) CH_4O

Ans. *(a)*

3. An organic compound containing C, H and N gave the following results on analysis C = 40%, H = 13.33%, N = 46.67%. Its empirical formula would be **[CBSE AIPMT 2002, 1999, 98]**

(a) $C_2H_7N_2$ (b) CH_5N
(c) CH_4N (d) C_2H_7N

Ans. *(c)*

4. An organic compound contains C = 40%, O = 53.34% and H = 6.60%. The empirical formula of the compound is **[CBSE AIPMT 1994]**

(a) CH_2O (b) CHO
(c) CH_4O_2 (d) C_2H_2O

Ans. *(a)*

5. The empirical formula of a compound is CH_2O. Its molecular weight is 180. The molecular formula of compound is : ***[1999]***

(a) C_4HO_4 (b) $C_3H_6O_3$
(c) $C_6H_{12}O_6$ (d) $C_5H_{10}O_5$

6. In a hydrocarbon, mass ratio of hydrogen and carbon is 1:3, the empirical formula of hydrocarbon is ***[2012]***

(a) CH_4 (b) CH_2
(c) C_2H (d) CH_3

7. Quantitative analysis of an organic compound (X) shows following \% composition. C : 14.5% Cl : 64.46\% H: 1.8 \% (Empirical formula mass of the compound (X) is 1655 $\times 10^{-1}$ (Given molar mass in $gmol^{-1}$ of C : 12, H : 1, O : 16, Cl : 35.5)

8. The elemental composition of a compound is 54.2%C, 9.2%H and 36.6%O. If the molar mass of the compound is 132 g mol^{-1}, the molecular formula of the compound is : [Given : The relative atomic mass of C : H : O = 12 : 1 : 16]

(1) $C_4H_9O_3$
(2) $C_6H_{12}O_6$
(3) $C_4H_8O_2$
(4) $C_6H_{12}O_3$

9 · **2024 (05 Apr Shift 1)**

An organic compound has 42.1% carbon, 6.4% hydrogen and remainder is oxygen. If its molecular weight is 342, then its molecular formula is :

(1) $C_{11}H_{18}O_{12}$
(2) $C_{12}H_{20}O_{12}$
(3) $C_{12}H_{22}O_{11}$
(4) $C_{14}H_{20}O_{10}$

2023

10 **- 25 January - Shift 2**

Number of hydrogen atoms per molecule of a hydrocarbon A having 85.8% carbon is 12
(Given : Molar mass of A = 84 g mol^{-1})

11 A metal chloride contains 55. 0% of chlorine by weight. 100 mL vapours of the metal chloride at STP weigh 0. 57 g. The molecular formula of the metal chloride is
(Given: Atomic mass of chlorine is 35. 5 u)
[2023 (12 Apr Shift 1)]
(1) MCl_4
(2) MCl_3
(3) MCl_2
(4) MCl

2022

12 - 27 June - Shift 2

116 g of a substance upon dissociation reaction, yields 7.5 g of hydrogen, 60g of oxygen and 48.5 g of carbon. Given that the atomic masses of H, O and C are 1, 16 and 12 respectively. The data agrees with how many formulae of the following?

(A) CH_3COOH (B) HCHO

(C) CH_3OOCH_3 (D) CH_3CHO

13 - 28 June - Shift 2

Compound A contains 8.7% Hydrogen, 74% Carbon and 17.3% Nitrogen. The molecular formula of the compound is,

Given : Atomic masses of C, H and N are 12, 1 and 14 amu respectively.

The molar mass of the compound A is 162 g mol^{-1}.

(A) $C_4H_6N_2$ (B) C_2H_3N

(C) C_5H_7N (D) $C_{10}H_{14}N_2$

14 JEE Main 2020 - 2 September (Evening)

The ratio of the mass percentages of 'C \& H' and 'C \& O' of a saturated acyclic organic compound 'X' are 4: 1 and 3: 4 respectively. Then, the moles of oxygen gas required for complete combustion of two moles of organic compound 'X' is 5.